HYDRO
THE POWER OF COMMITMENT

Lower Churchill Hydroelectric Generation Project

Project Registration Pursuant to the Newfoundland and Labrador *Environmental Protection Act*

and

Project Description Pursuant to the *Canadian Environmental Assessment Act*

Submitted by Newfoundland and Labrador Hydro

November 30, 2006

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PREFACE

Newfoundland and Labrador Hydro ("Hydro") has achieved an important stage in planning for the development of the hydroelectric potential of the lower Churchill River with the filing of this Registration and Project Description of the Lower Churchill Hydroelectric Generation Project (the "Project") for environmental assessment. This document will start the formal environmental assessment processes of both the federal and provincial governments. It is a Registration under the provincial environmental assessment legislation (Newfoundland and Labrador *Environmental Protection Act*) and a Project Description intended to commence the federal environmental assessment process under the *Canadian Environmental Assessment Act*. The document also provides the basis for governments to discuss coordination of the environmental assessment.

Engineering design and baseline environmental studies for the Project are already well advanced by virtue of past and on-going efforts to plan the undertaking and to assess its potential environmental effects. The Project includes the generation sites at Gull Island and Muskrat Falls, as well as the interconnecting transmission lines between these two generating sites and Churchill Falls. Together, these two sites will generate an estimated 2,800 Megawatts (MW) of electricity. By way of comparison this represents over one half of the capacity at the Churchill Falls Generating Station (5,428MW). While substantial, the power to be generated by the Project can be absorbed by the growing energy demand in eastern North America.

Planning for developing the hydroelectric potential of the lower Churchill River has been underway for over 30 years. Thus, there exists an impressive body of knowledge about the Project, the issues of concern and how the Project may affect the environment. One complete environmental assessment was conducted in 1980, including a Panel Review and Hearings. The Panel found that the proposed project was acceptable, provided environmental and socio-economic conditions were met. More recently, additional extensive environmental studies were conducted. As a consequence, the environmental assessment process will be supported by a comprehensive understanding of the natural environment of the lower section of the Churchill River valley. Regulatory authorities will be able to rely on this existing body of knowledge throughout the environmental assessment process. Most of the time and effort associated with the environmental assessment can therefore be focused on an informed discussion of the Project, the known issues and concerns, and mitigation measures.

While acknowledging there are important issues to be addressed through the environmental assessment processes, Hydro is encouraged by the extensive benefits to be realized with the development of the lower Churchill River for electric power generation. The rationale for this Project is summarized by these potential benefits:

- provision of a sustainable energy supply;
- reduced greenhouse gas production by replacing carbon intensive sources of energy generation;
- realization of a long term revenue source for the Province;
- a proposed Impacts and Benefits Agreement for the Labrador Innu;
- direct employment and economic benefits to the people of Labrador, and the Province; and
- spin-off benefits for Labrador.

Hydro, through the implementation of its *Environmental Policy and Guiding Principles*, has a solid record of responsible environmental stewardship, including the thorough environmental assessment of all major undertakings. The company is confident that the environmental assessment of the Lower Churchill Hydroelectric Generation Project can now be undertaken in a timely, efficient, and effective manner.

Table of Contents

List of Appendices

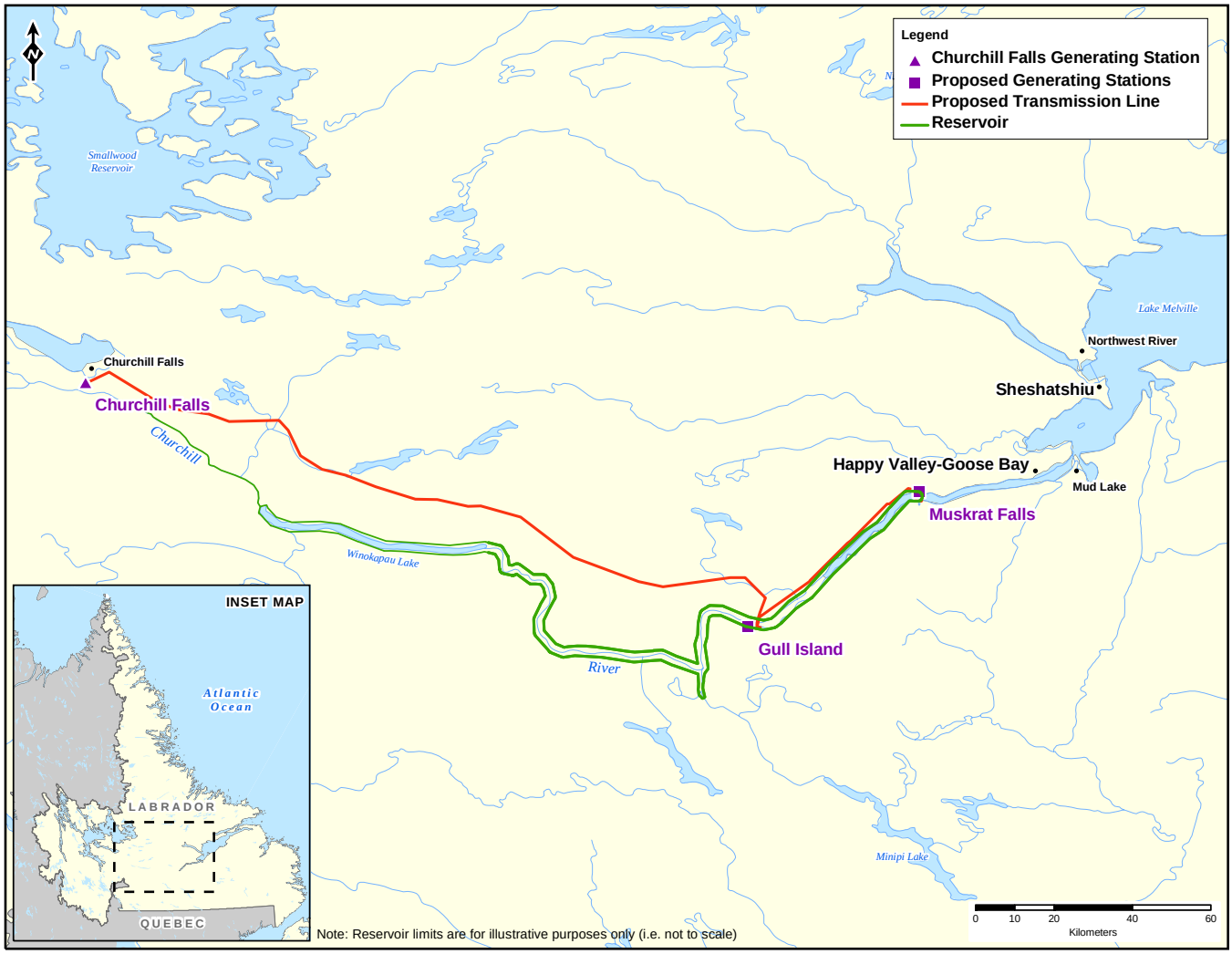
List of Figures

List of Tables

1.0 INTRODUCTION

Newfoundland and Labrador Hydro ("Hydro") is proposing to develop hydroelectric generating facilities with interconnecting transmission lines on the lower section of the Churchill River, Labrador (Figure 1.1). Generation facilities with a combined capacity of approximately 2,800 MW will be installed at Gull Island and Muskrat Falls. Interconnecting transmission lines will be installed between these generating sites and Churchill Falls. This undertaking is called the Lower Churchill Hydroelectric Generation Project (the "Project"). Gull Island and Muskrat Falls are approximately 100 km and 30 km southwest of Happy Valley-Goose Bay, respectively.

Figure 1.1 Location of Lower Churchill Project



The Project will undergo an environmental assessment in accordance with regulatory requirements and in compliance with Hydro policy. Hydro currently operates 10 hydroelectric facilities in Newfoundland and Labrador, each of which was assessed in compliance with the applicable environmental assessment requirements at the time they were developed. Hydro will apply its experience to the

environmental assessment of this Project. Potential adverse environmental effects that may result from the Project will be assessed so that selected mitigation measures can be applied to avoid or reduce adverse environmental effects and enhance benefits. Stakeholder groups and the interested public will have opportunities to ask questions and provide input throughout the environmental assessment.

In conducting environmental assessments, baseline information on the existing biophysical and socio-economic environments is usually collected over a one to two year period, and this information forms the basis for the prediction of environmental effects. Baseline information has been collected over the past 30 years for this Project, beginning with the initial proposal to develop the hydroelectric potential of the lower section of the Churchill River in the 1970s. A full federal government Panel Review was completed in 1980 to assess the environmental effects of the proposal. This involved the collection and analysis of environmental baseline data and the preparation of an Environmental Impact Statement ("EIS"). An extensive body of knowledge therefore exists on the surrounding environment. This, in combination with the fact that the effects of hydroelectric projects in general are well understood, means the Project can and will be planned so as to reduce its potential adverse environmental effects and optimize beneficial effects.

Since the Panel Review was conducted in 1980, land claims in this area of Labrador by the Innu of Labrador have been accepted for negotiation by the Governments of Canada and of Newfoundland and Labrador. Hydro and Innu Nation are working together through Process Agreements to undertake consultation within the Innu communities, to conduct negotiations toward an Impacts and Benefits Agreement ("IBA"), and to involve the Innu in the environmental and technical work being carried out for the Project and in planning for its environmental assessment.

The Project will provide benefits to the residents of Newfoundland and Labrador through job creation, the provision of power, procurement opportunities and long-term revenue generation. Benefits from royalties resulting from energy sales will be realized by all Labradorians and Newfoundlanders.

1.1 Purpose of the Project Registration and Description Document

The Project is subject to Part X of the Newfoundland and Labrador *Environmental Protection Act* ("*NLEPA*"), and the provisions of the *Canadian Environmental Assessment Act* ("*CEAA*"). An environmental assessment of the Project will be conducted to satisfy the requirements of both Acts.

This document:

- initiates the provincial and federal environmental assessment processes pursuant to the *NLEPA* and *CEAA*, respectively;
- describes the Project, the purpose of the Project and alternatives within the Project;
- describes the key elements of Hydro's Environmental Management System;
- describes Project features and design mitigations;
- provides a brief overview of environmental baseline studies; and
- provides an overview of potential Project-related environmental issues raised through previous initiatives.

1.2 Project Overview

Development of the hydroelectric potential of the Churchill River began in 1960 with the construction of the Twin Falls power plant. This plant was built to provide power to the iron ore mines at Labrador City and Wabush. Twin Falls was decommissioned in 1974 with the full commissioning of the Churchill Falls Generating Station (also referred to as the Upper Churchill Project). The 5,225 MW (upgraded to 5,428 MW in 1985) Churchill Falls Generating Station is one of the largest underground powerhouses in the world. In total, the site captures about two-thirds of the hydroelectric potential of the Churchill River. Consequently, most of the flow in the Churchill River has been regulated since the Churchill Falls Generating Station started operation in 1971. The Lower Churchill Hydroelectric Generation Project involves tapping the remaining hydroelectric potential of the Churchill River at Gull Island and Muskrat Falls (Figure 1.1).

The Project consists of a generating facility at Gull Island, a generating facility at Muskrat Falls, a 735 kilovolt (kV) transmission line between Gull Island and Churchill Falls, and a 230 kV transmission line between Muskrat Falls and Gull Island. The total installed generating capacity at Gull Island will be approximately 2,000 megawatts (MW). The planned total installed capacity at Muskrat Falls is approximately 800 MW.

The nine-year long construction period is scheduled to begin at Gull Island in mid-2009. First power is scheduled in mid-2014. Construction of Muskrat Falls will be initiated approximately three years following the start of the construction of Gull Island. A more detailed Project Description is provided in Section 3.

1.3 The Proponent

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Hydro is a Crown Corporation with a mandate to deliver reliable, least cost-energy to residents and industry in Newfoundland and Labrador. The installed generating capacity of 7,289 MW is the fourth largest of all utility companies in Canada and Hydro is the province's major energy provider. Every year, Hydro generates and transmits over 80 percent of the electrical energy consumed by Newfoundlanders and Labradorians.

As a Crown corporation, Hydro is owned entirely by the Province of Newfoundland and Labrador. Hydro is the parent company of the Hydro Group of Companies which includes Churchill Falls (Labrador) Corporation ("CF(L)Co."), and the Lower Churchill Development Corporation ("LCDC"), a non-operating company that holds the water rights associated with the Project. CF(L)Co. is owned 65.8 percent by Hydro and 34.2 percent by Hydro Québec. CF(L)Co. owns and operates the hydroelectric generating plant (5,428 MW), located in Churchill Falls, Labrador, as well as 1,250 km of distribution and transmission lines

Hydro generates, transmits and distributes electrical power to utility, industrial and retail customers. The primary power generating assets on the island of Newfoundland (the "Island") include:

- nine hydroelectric plants with a total installed capacity of 940 MW;
- one 490 MW oil-fired thermal generating plant; and
- four gas turbines with a total capacity of 150 MW.

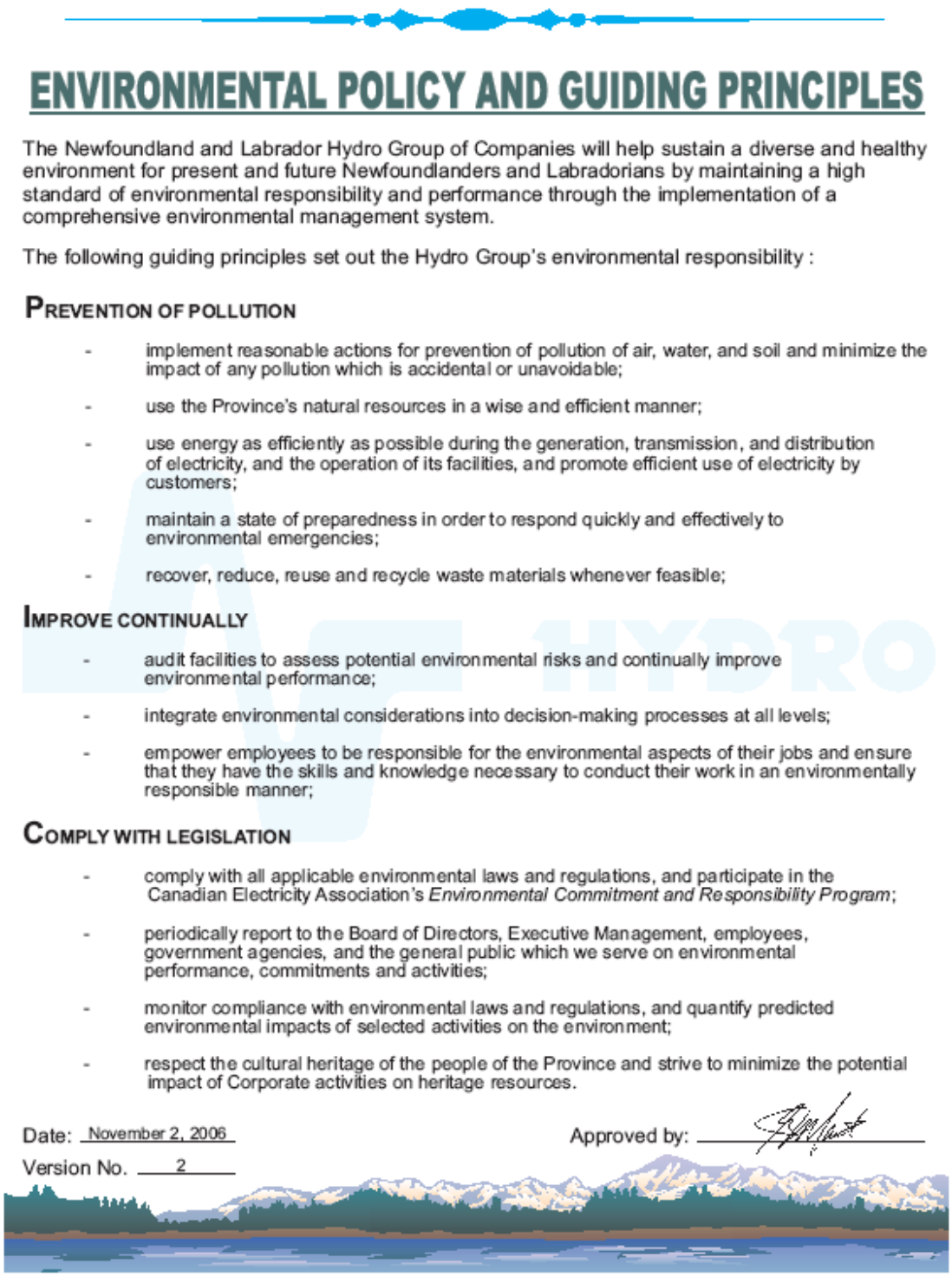
Hydro also operates an interconnected electrical power system on the Island, a separate interconnected system in Labrador, and 26 isolated generation (56.4 MW) and distribution systems throughout rural areas of the province. The total lengths of the distribution and transmission lines on the Hydro system are 3,653 and 3,697 km, respectively.

Hydro is principally a wholesaler of electricity on the Island, where it sells the bulk of its power to Newfoundland Power (an investor-owned utility), and several industrial customers. Hydro also sells directly to over 35,000 residential and commercial customers in rural Newfoundland and Labrador.

Hydro established an Environmental Services Department in 1975 to provide environmental management expertise, advice and assistance on all aspects of the corporation's activities. Since that time, Hydro has demonstrated leadership in environmental assessment, environmental compliance and effects monitoring, environmental auditing, and environmental protection planning. Hydro's *Environmental Policy and Guiding Principles* is presented in Figure 1.2. Hydro has been recognized by such organizations as the Newfoundland and Labrador Association of Professional Engineers and Geoscientists and the National Hydropower Association for outstanding stewardship and environmental management. In 2002, the *Newfoundland and Labrador Environmental Award* was awarded to Hydro in the Business Category for "a business that has demonstrated the exemplary attitude and concern for the environment through sound environmental management policy, and has demonstrated action to prevent or reduce pollution".

Additional information can be obtained from the Newfoundland and Labrador Hydro web site at www.nlh.nl.ca.

Figure 1.2 Newfoundland and Labrador Hydro Environmental Policy and Guiding Principles



ENVIRONMENTAL POLICY AND GUIDING PRINCIPLES

The Newfoundland and Labrador Hydro Group of Companies will help sustain a diverse and healthy environment for present and future Newfoundlanders and Labradorians by maintaining a high standard of environmental responsibility and performance through the implementation of a comprehensive environmental management system.

The following guiding principles set out the Hydro Group's environmental responsibility :

PREVENTION OF POLLUTION

- implement reasonable actions for prevention of pollution of air, water, and soil and minimize the impact of any pollution which is accidental or unavoidable;
- use the Province's natural resources in a wise and efficient manner;
- use energy as efficiently as possible during the generation, transmission, and distribution of electricity, and the operation of its facilities, and promote efficient use of electricity by customers;
- maintain a state of preparedness in order to respond quickly and effectively to environmental emergencies;
- recover, reduce, reuse and recycle waste materials whenever feasible;

IMPROVE CONTINUALLY

- audit facilities to assess potential environmental risks and continually improve environmental performance;
- integrate environmental considerations into decision-making processes at all levels;
- empower employees to be responsible for the environmental aspects of their jobs and ensure that they have the skills and knowledge necessary to conduct their work in an environmentally responsible manner;

COMPLY WITH LEGISLATION

- comply with all applicable environmental laws and regulations, and participate in the Canadian Electricity Association's *Environmental Commitment and Responsibility Program*;
- periodically report to the Board of Directors, Executive Management, employees, government agencies, and the general public which we serve on environmental performance, commitments and activities;
- monitor compliance with environmental laws and regulations, and quantify predicted environmental impacts of selected activities on the environment;
- respect the cultural heritage of the people of the Province and strive to minimize the potential impact of Corporate activities on heritage resources.

Date: November 2, 2006 Approved by: _____

Version No. 2

1.4 Environmental Assessment Requirements

The Project is subject to the *NLEPA* and to *CEAA*. The potential environmental effects of the Project will be assessed in accordance with both of these Acts.

Under *NLEPA*, the Project is defined as an undertaking subject to Part X, pursuant to Section 34(1)(a) and 34(1)(d) of the *Environmental Assessment Regulations*.

> *34. (1) An undertaking that will be engaged in electric power generation and the provision of structures related to that power generation, including*
>
> *(a) the construction of dams and associated reservoirs where the area to be flooded is more than 50 hectares;*
>
> *(d) the construction of hydroelectric power developments with a capacity of more than one megawatt.*

Under *CEAA*, it is expected that Fisheries and Oceans Canada ("DFO") and Transport Canada will have federal regulatory responsibilities by virtue of *Law List Regulation* triggers that apply to the Project. These Responsible Authorities ("RAs") will ensure that an environmental assessment is conducted prior to the issuance of federal permits and authorizations for the Project.

The following *Law List Regulations* triggers may apply to the Project:

- issuance of authorization by DFO for work related to the construction of the hydroelectric generating facilities with the potential for harmful alteration, disruption or destruction of fish habitat pursuant to sub-section 35(2) of the *Fisheries Act*, and
- issuance of a permit by Transport Canada for the construction of the hydroelectric generating facilities pursuant to sub-section 5(1) of the *Navigable Waters Protection Act*.

The Project will require a Comprehensive Study level of environmental assessment pursuant to *CEAA.* Sections 4 (b), and 7 of the associated *Comprehensive Study List Regulations* specify that the following projects require a Comprehensive Study:

> *4. The proposed construction, decommissioning or abandonment of*
>
> *(b) a hydroelectric generating station with a production capacity of 200 MW or more.*
>
> *7. The proposed construction of an electrical transmission line with a voltage of 345 kV or more that is 75 km or more in length on a new right of way.*
>
> *8. The proposed construction, decommissioning or abandonment of a dam or dyke that would result in the creation of a reservoir with a surface area that would exceed the annual mean surface area of a natural water body by 1,500 hectares, or an expansion of a dam or dyke that would result in an increase in the surface area of a reservoir of more than 35 percent.*

Other federal authorities that may have an interest in the environmental assessment of the Project include Environment Canada, Health Canada and Natural Resources Canada.

Hydro will continue its on-going discussions and consultations with Innu Nation, and will conduct public and stakeholder consultations. Environmental baseline information is being collected, reviewed, and consolidated for the environmental assessment. The level of environmental assessment will be determined by the federal and provincial Ministers of Environment. The environmental assessment document will present the results of the environmental effects analyses, including an overview of the baseline environment, the nature and results of the scoping exercise, the prediction of environmental effects, an identification of proposed mitigation measures, an evaluation of predicted residual effects and their significance, an assessment of cumulative effects, and a proposed follow-up program.

1.5 Innu Nation Involvement

The Labrador Innu land claim has been accepted for negotiation by the federal and provincial governments. The negotiation of a Land Claim Agreement-in-Principle (the interim step before a Final Agreement) is ongoing between Innu Nation and the governments of Newfoundland and Labrador and Canada. The Project is located within the Labrador Innu Land Claim Area. Hydro and Innu Nation have put in place Process Agreements to provide for Innu-led consultations on the Project in the Innu communities, to conduct negotiations towards an IBA, and to facilitate the direct participation of Innu in the environmental and technical work being carried out for the Project.

Under the current Process Agreement (signed July 2006), Hydro and Innu Nation are continuing negotiations towards an IBA, which, once concluded, would define how the Labrador Innu might participate in the development. The specific nature and provisions of the IBA have yet to be finalized, but will include processes for continued consultation on the Project during construction and operations, as well as mechanisms for identifying and addressing the potential adverse effects of the Project on Innu and Innu communities, and for optimizing potential benefits.

Hydro and Innu Nation have established mechanisms for Innu-led consultations on the Project in the communities of Sheshatshiu and Natuashish. These consultations will provide an on-going means to inform Innu on the nature and status of the Project, and to find out what people think about the Project and its potential environmental effects.

A process has also been established to facilitate Innu involvement in planning, conducting and reviewing the environmental and technical work for the Project. A Task Force consisting of technical representatives from Hydro and Innu Nation is involved in designing and implementing the baseline environmental study program, and in planning for the environmental assessment. It is anticipated that the role and mandate of the Task Force will evolve to be the primary forum for Innu Nation involvement in the preparation of the environmental assessment.

An Innu Traditional Knowledge Committee of Innu elders has also been established to document and share Innu traditional knowledge for the environmental assessment. Traditional knowledge shared through this process will be discussed, considered and as appropriate, incorporated into the environmental assessment in a manner that will be agreed between Hydro and Innu Nation.

Each of these processes is designed to share information, both in terms of informing Innu Nation and the Innu communities about the Project, and in identifying and attempting to address any associated questions, concerns and issues. They will, therefore, serve as key sources of information for the environmental assessment.

2.0 SETTING

The following provides a description of the area within which the Project will be located. The material presented is based on currently available information. For example, community profile and population statistics are based on Community Accounts, an information system administered by the Government of Newfoundland and Labrador.

2.1 The Land

The headwaters of the Churchill River are located near the western boundary of Labrador, occurring within the upland plateau of interior Labrador before dropping sharply at Churchill Falls. The geological substructure of Labrador is primarily Precambrian bedrock of the Canadian Shield. Rocks are mainly metamorphic, in the forms of gneisses and granites. Some volcanic rock units occur in western Labrador. A belt of metasedimentary, metavolcanic, volcanic, metamorphic, and igneous rocks, (the "Labrador Trough") forms part of a broad arc trending north-northwest to south-southeast.

With the retreat of ice sheets following the last glaciation, the land mass previously underneath the ice sheets has been slowly rising. The valley of the Churchill River is deeply incised into the surrounding upland. The lower stretches are characterized by marine sediments including clays and silts in terraces and deposits above current sea level in the lower reaches of the river, including the vicinity of Muskrat Falls. Near Lake Melville, extensive deltaic sand deposits occur in the vicinity of Happy Valley-Goose Bay.

As the land slowly became exposed following glaciation, plant species extended their ranges northward. The terrestrial, freshwater, and marine ecosystems that subsequently developed in the Churchill River valley and watershed are the result of biological colonization, geography, and climate. Scientists have developed a national ecological classification scheme that divides the natural environments of Canada into regions termed "ecozones". The Churchill River watershed is located within the Boreal Shield and Taiga Shield ecozones. The Boreal Shield ecozone is typified by coniferous forest cover overlying the geological structure of the Canadian Shield and is the most widespread ecozone in Labrador. It is found more frequently in sheltered areas and particularly in the Churchill River valley. The Taiga Shield ecozone is sub-arctic and represents a transition between the boreal forest ecosystems to the south and Arctic ecosystems found further to the north. It is found more at higher elevations of the valley and in the upland areas of the watershed.

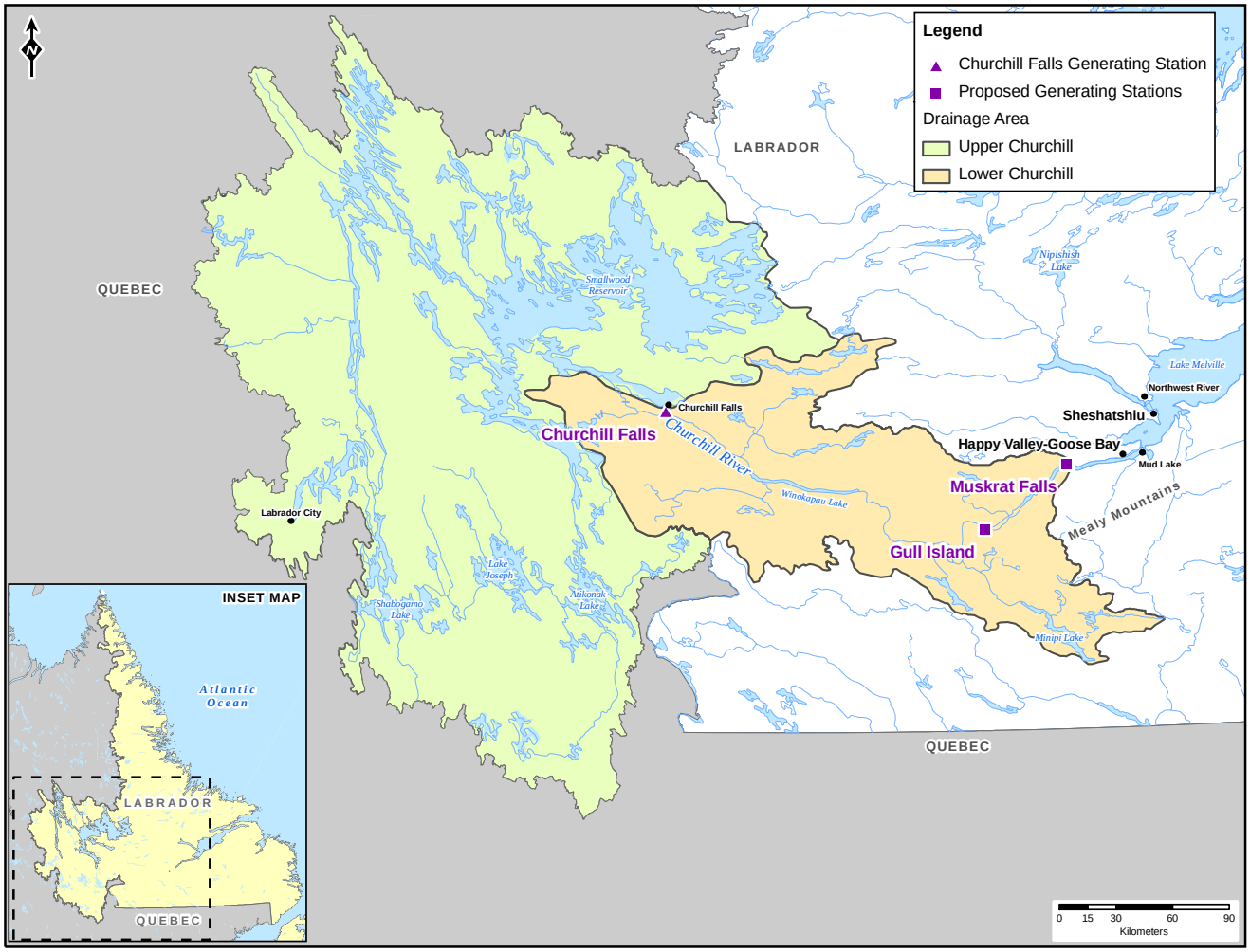
The climate in the Upper Lake Melville area tends to be relatively moderate, with temperatures at the mouth of the Churchill River, in Happy Valley-Goose Bay, ranging from a daily average of -17.3°C in January to 15.5°C in July. Temperatures become cooler upstream of the Upper Lake Melville area, and at higher elevations. The Churchill River valley typically receives approximately 1,000 mm of precipitation annually, 45 percent of which falls as snow.

2.2 The River Valley

The Churchill River is the largest river in Labrador. It was re-named in 1965, having been originally referred to as Grand River, and then the Hamilton River. The Innu name for it is Mishta-shipu. It drains a basin of approximately 92,500 km², and is approximately 856 km long from its headwaters near the

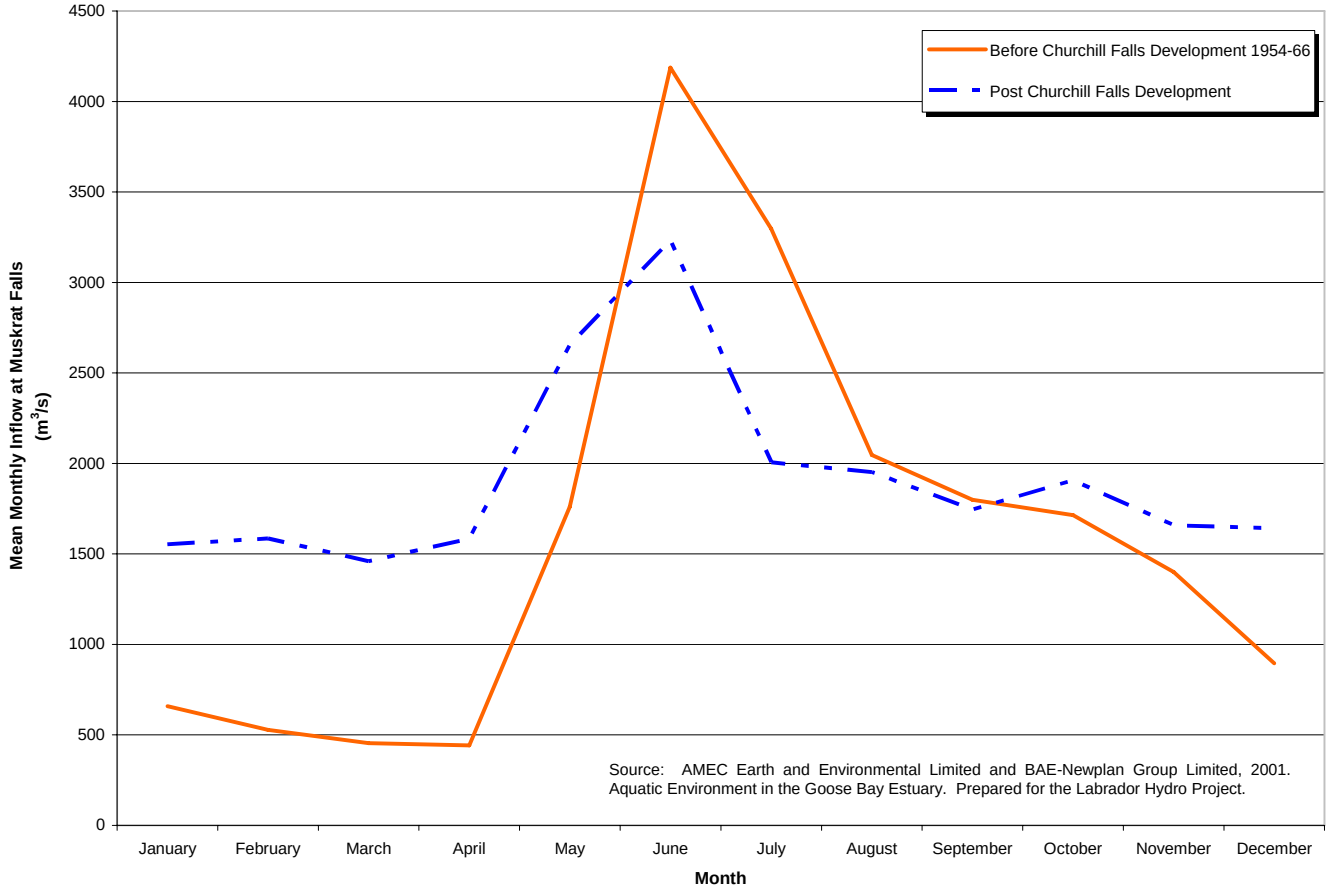
western Labrador boundary to Lake Melville. The lower Churchill River and Lake Melville formed in a trough aligned in a northeast-southwest direction, and the river runs in a general west to east orientation (Figure 2.1). The Mealy Mountains are directly adjacent to the trough on its southeastern side. The Churchill River empties into Lake Melville, which flows into the Labrador Sea. The valley created by the Churchill River experiences a boreal ecoclimatic regime, as compared to the taiga (sub-arctic) region that occurs at higher altitudes directly adjacent to the valley.

Figure 2.1 Project Setting



The hydrology of the Churchill River basin reflects the regional climate; runoff is strongly seasonal with high flows in the spring (typically peaking in May or June) and low flows in late winter. The average annual flow at Churchill Falls is 1,390 m^3/s. At Gull Island it is 1,780 m^3/s and at Muskrat Falls it is 1,840 m^3/s. Flows in the Churchill River are moderated by the operation of the Churchill Falls Generating Station which has been in place for more than 30 years. As an illustration of downstream flow effects, the highest average monthly flows at Muskrat Falls have decreased (June) and the lowest monthly flows have increased (April), compared to flows before the Churchill Falls Generating Station became operational. This has resulted in a less variable flow regime over the course of the year, both seasonally and monthly, as shown in Figure 2.2.

Figure 2.2 Average Monthly Flow at Muskrat Falls - Before Churchill Falls Plant Operation and Currently



River morphology is classified on the basis of sinuosity (straight or curved), number of channels, and stability (permanence of bar features, type and height of vegetation, development of bogs and fens, and sediment exposures.) The reach of the Churchill River from Gull Island to Muskrat Falls is a straight-to-sinuous, single-channel system. Downstream of Muskrat Falls, the Churchill River transitions from a wandering system to a braided system, with less stability and more multiple-channel reaches.

The lower Churchill River valley is located at elevations less than 400m. It lies within the boreal ecoclimatic region where microclimatic conditions in the valley allow boreal species to dominate over sub-arctic species, especially on south-facing slopes. Boreal plant species assemblages include large conifers such as white and black spruce and balsam fir, and larch. Most trees in Labrador do not exceed 10 m, but within the valley white spruce may exceed 15 m in height. Associated deciduous species and understory vegetation typical of the boreal forest include white birch, alder, mountain maple, dogberry, chuckley-pear, pin cherry, willow, balsam poplar, aspen, juniper, crowberry, moss heather, squashberry, mountain avens, partridgeberry, marshberry, bearberry, raspberry, Labrador tea, bog rosemary, sweet gale, blueberry, and bilberry.

The Churchill River and its valley support a wide variety of wildlife species that occur year-round, seasonally, or use the waterway as a travel route. Wildlife species that use the river and valley include beaver, porcupine, muskrat, mink, and otter. Large mammals that use the valley for shelter and/or as a

travel corridor include caribou, moose and black bear. Waterfowl species include the Common Loon, Canada Goose, and Black Duck.

Water quality is pristine within the Project area with low or non detectable trace metal concentrations. The pH is generally near neutral. However, nutrient concentrations (phosphorus and nitrogen compounds) are generally not detectable, indicating low potential for biological productivity. The following fish species have been documented in the Churchill River and/or its tributaries: brook trout; lake trout; lake whitefish; round whitefish; longnose and white sucker; northern pike; lake chub; burbot; and pearl dace; stickleback; sculpins; rainbow smelt; Arctic char and ouananiche (land-locked Atlantic Salmon). Sea-run Atlantic salmon and Arctic char are found downstream of Muskrat Falls, but only land-locked Atlantic salmon occur upstream of Muskrat Falls.

The federal *Species at Risk Act* ("*SARA*") and the provincial *Endangered Species Act* ("*NLESA*") contain lists of designated endangered, threatened, special concern, and vulnerable species in Canada and in Newfoundland and Labrador respectively. "Endangered" is the most sensitive designation. The range of several designated species extends into, or may extend into, the Project area. The eastern population of wolverine has been designated as endangered. Threatened species include the boreal population of woodland caribou. Three herds of woodland caribou are designated by *NLESA*: Lac Joseph, Mealy Mountain, and Red Wine. Species of special concern under *SARA*, and vulnerable species under *NLESA*, include the eastern population of Harlequin Duck, Barrow's Goldeneye, and Fernald's milk-vetch.

2.3 The People

Labrador has a cultural heritage stretching back 8,000 years. Today, an estimated 28,000 people live in Labrador, including both Aboriginal and non-Aboriginal residents, distributed in small communities scattered along the coast and in a few larger centres in central and western Labrador.

2.3.1 Pre-contact Cultures

The central interior of Labrador appears to have been occupied only by the "Indian" cultures (Maritime Archaic, Intermediate and Late Pre-contact). In the central interior, including the Churchill River valley, sites of the earliest Maritime Archaic period are present but are not common. The most intensive pre-contact occupation appears to have occurred in the Intermediate Period (beginning approximately 3,500 years ago), since most interior sites, including the Churchill River valley, date to this period. Thereafter, interior sites become somewhat less common in the Late Pre-contact period, while sites become more numerous on the Labrador coast. This may reflect an increasing reliance on coastal resources by Late Pre-contact people that continued until the arrival of Europeans on the Labrador coast.

2.3.2 Contemporary Society

The Innu were previously known as Montagnais or Naskapi Indians. They were traditionally a nomadic people, whose movements responded to the seasons and to the migrations of the animals they relied upon for existence. Physically, as well as spiritually, the Innu depended greatly on the caribou, a dietary staple. Much of the year was spent hunting, trapping and fishing such species as caribou, bear, beaver, porcupine, migratory waterfowl, small game such as partridge, muskrat and rabbits, and fish including salmon, char, trout, pike, and suckers. Various types of berries were also harvested in

season. This traditional way of life continued until the mid-20th century, when many Innu were settled into government housing and began to receive formal education. Innu continue to attach great importance to time spent in Nutshimit (the country). For many Innu, this is seen as an opportunity for cultural and physical renewal and as an opportunity to reaffirm the importance of the Innu connection with the land and each other.

Today there are two Innu communities in Labrador – Natuashish on the North Coast, and Sheshatshiu in the Upper Lake Melville region. In 1967, the Mushuau Innu were settled in Davis Inlet, on the eastern side of the Island of Iluikoyak. In the winter of 2002-2003 the Mushuau Innu resettled to the community of Natuashish on the mainland. As of 2003, there were approximately 580 Innu living in Natuashish and another 1,400 in Sheshatshiu. Small numbers of Labrador Innu also reside in Labrador City-Wabush, Happy-Valley-Goose Bay, St. John's and elsewhere.

The Labrador Innu land claim has been accepted for negotiation by the federal and provincial governments, and the negotiation of an Agreement-in-Principle is ongoing between Innu Nation and the governments of Newfoundland and Labrador and Canada. The Innu Nation Land Claim Area includes the Project area. It is the only land claim in the Project area that has been accepted for negotiation by both the federal and provincial governments.

The Inuit of Labrador are descended from the eastern Thule people, who arrived in northern Labrador between 1300 AD and 1450 AD. By the late 18th century the Inuit had established themselves along portions of the Labrador coast. The Inuit were a mobile people, but their harvesting efforts focused on the sea. Inuit hunted marine mammals and birds from kayaks in open-water season and from the ice in winter. They moved to summer camps in the adjacent hinterland when ice cleared to fish the inland waters for char and to hunt caribou in the late summer. As Europeans settled the Labrador coast, beginning with a Moravian mission in Nain in 1771 followed by Hudson's Bay Company and independent trading posts the Labrador Inuit became more sedentary and participated increasingly in the cod fishery and fur trade.

The Inuit of Labrador are primarily resident on the Labrador North Coast in the communities of Nain, Hopedale, Makkovik, Postville, Rigolet (approximately 2,600) and in the Central Labrador communities of North West River and Happy Valley-Goose Bay (approximately 1,900), with other Inuit residing in Cartwright, Labrador City, St. John's and elsewhere. With the effective date of the Labrador Inuit Land Claims Agreement on December 1, 2005, the Labrador Inuit established their own Nunatsiavut Government.

Non-aboriginal settlement in Labrador began in the 18th century, following the development of seal and cod fisheries and expansion of the fur trade. Mining in western Labrador, hydroelectric development at Churchill Falls and military operations at Goose Bay further spurred non-aboriginal settlement in the 20th century.

The Labrador Metis Association was established in 1985, and renamed the Labrador Métis Nation (LMN) in 1998. The LMN reports a membership of approximately 6,000 members. They live throughout Labrador and elsewhere, with concentrations in the Lake Melville area and along the southern coast from Cartwright to Mary's Harbour. The LMN has asserted a land claim in the region; however, this claim has not been accepted for negotiation by either the federal or provincial governments.

2.3.3 Regional Socio-economic Setting

Labrador has five general regions, based on Statistics Canada Census Consolidated Subdivisions: the North Coast, Labrador West, Upper Lake Melville, Labrador Straits, and East Coast. The Project is located in the Labrador West and Upper Lake Melville regions.

Happy Valley-Goose Bay is the largest community in the Upper Lake Melville region. The Upper Lake Melville region includes most of the Churchill River valley and south-central Labrador. It includes the communities of Happy Valley-Goose Bay, Mud Lake, North West River, Rigolet and Sheshatshiu. In 2001, it had a population of 9,960 (down 5.1 percent from 10,500 in 1996), and an unemployment rate of 14.5 percent. An Air Force base (5 Wing Goose Bay) has been operating at Happy Valley-Goose Bay since World War II.

Government agencies providing health care, transportation, and education services to central and coastal Labrador are located in Happy Valley-Goose Bay. The town is also benefiting from growth in mining and related activity, including the success of the Voisey's Bay Mine/Mill. However, it is also being negatively affected by declining demand for foreign military training. Other investments are needed to help the town and region diversify their economies and develop new enterprises. Considerable attention has been given over the past several years to using the assets at 5 Wing Goose Bay for alternative purposes.

Labrador West includes the communities of Labrador City-Wabush and Churchill Falls. In 2001, the region had a population of 10,285 (down from 11,195 in 1996), and an unemployment rate of 9.7 percent. The adjacent communities of Labrador City and Wabush are based on iron ore mining. Churchill Falls (population 645) was built by CF(L)Co. to operate and maintain the Churchill Falls Generating Station.

Land and resource use in the Project area is concentrated primarily near the adjacent communities. From the Upper Lake Melville area, trapping has evolved into a predominately part-time or recreational activity centered along the Labrador West to Happy Valley-Goose Bay section of the Trans Labrador Highway (TLH). Cabins are located adjacent to the Highway, with concentrations at crossings of tributary systems that flow into the mainstem of the Churchill River. Above Winokapau Lake a series of cabins occur along the river margins, accessed by boats travelling from Churchill Falls. Recreational, subsistence and leisure activities within the Project area include hunting, trapping, berry-picking and angling. Snowmobiling and boating tend to be associated with these activities. Some adventure tours occur along the length of the river between Churchill Falls and Happy Valley-Goose Bay; but there are no licensed outfitter camps established adjacent to the mainstem of the river. Wood harvesting, both commercial and domestic, is common near Upper Lake Melville communities. The completion of the Phase 3 of the TLH (Happy Valley-Goose Bay to Cartwright Junction) will open areas south of the mainstem to vehicle traffic and may result in a shift in resource harvesting patterns.

3.0 PROJECT DESCRIPTION

The Project consists of hydroelectric generating facilities at Gull Island and Muskrat Falls and interconnecting transmission lines between these facilities and Churchill Falls.

3.1 Rationale and Need

Hydro's core business is the generation and transmission of safe, reliable, least-cost power to residents, businesses and industries of the Province. The development of the Project will help to achieve this objective. The Churchill River is recognized as a significant, long-term, reliable source of renewable hydroelectric energy. The potential of this resource has yet to be fully developed. The existing Churchill Falls Generating Station is located 225 km upstream from the Gull Island site. This facility came into service in 1971, and currently generates an average of 34 TeraWatt hours (TWh) of energy per year. The generating facilities at Gull Island and Muskrat Falls will respectively produce an additional 11.9 and 4.8 TWh annually. Development of the untapped hydroelectric potential on the Churchill River will contribute benefits to the Province of Newfoundland and Labrador as a long-term renewable energy supply and a source of revenue, which is consistent with Hydro's mandate to deliver a Project that will maximize benefits for the Province. During construction, the Project will also make a strong contribution to the local and provincial economy through associated direct, indirect and induced employment, and business opportunities.

The Project will be developed to meet future power requirements in the province and will generate revenue from sales outside the province. The portion of the power that is in excess of provincial requirements will likely be exported, given the magnitude of the generating capacity relative to forecasted provincial load growth. There is considerable forecast demand for new electrical generation in eastern North America in the coming decades; therefore, it is anticipated that a ready market will exist for electric energy from the Project. Hydro intends to implement employment and contracting measures that will optimize economic benefits to residents of the Province from the Project.

3.2 Environmental Management

The number and diversity of environmental challenges facing large companies require a structured and consistent management approach. The Hydro Group has chosen the ISO 14001 Environmental Management System (EMS) standard developed by the International Organization for Standardization (ISO) to manage its environmental aspects. This decision has resulted in continual improvement of environmental performance, while fulfilling Hydro's mandate to provide customers with cost-effective and reliable power. Several of the Hydro generation facilities, including Churchill Falls, have been individually registered by an external auditor (Quality Management Institute – QMI) as compliant with the ISO 14001 standard.

The Project will be constructed and operated in accordance with the overall Hydro EMS. A project-specific EMS will be prepared and implemented that is consistent with Hydro's *Environmental Policy and Guiding Principles* (Figure 1.2).

3.2.1 Project Planning and Application

Integral to Hydro's overall EMS is the consideration of environmental issues at the earliest stages of Project planning and design. This approach, which also includes "designed-in mitigation", is a very effective planning tool. By using this approach in planning and design, the resulting mitigation measures are more likely to be effective because they have become integrated into the Project from the earliest stages. Further, the early identification of mitigation measures improves the accuracy of project cost and schedule definition. Discussed below are some examples to illustrate how Hydro has already incorporated the designed-in mitigation approach to the Project.

The Project has the potential to result in both beneficial and adverse effects on Innu society and culture. To increase benefits, Hydro and Innu Nation are working to find ways to involve the Innu in the early stages of the Project. For example, contractors conducting baseline environmental studies have included Innu assistants on their study teams. Where possible, Innu field assistants will also be included on engineering study teams. Training has been provided to Innu members of the study teams, including on-the-job training, mentoring, and more formal training such as in archaeological methods and techniques.

The routing of the transmission line will be determined through a comprehensive constraint mapping exercise. Alternative routes will be assessed using technical and environmental criteria. This approach will serve to reduce or avoid the interactions of the Project with sensitive environmental components.

One of the Project-environment interactions will be the environmental effects of the reservoir on shoreline habitat. To address this, Hydro has completed a detailed aerial imaging survey which will provide the ability to delineate the future reservoir shoreline and to identify natural features present along the river valley within the Project area. With this tool the Project team will be able to make precise predictions about the character of the reservoir perimeter (where delta formation will occur, where new wetlands will develop) and, as required, accurately locate candidate sites for mitigation measures.

In anticipation that the Project will affect fish habitat, Hydro has developed innovative methods for habitat quantification. These methods, developed with review input from scientists in DFO, will facilitate the decision-making process within DFO. In evaluating the environmental effects of the Project on fish and fish habitat, DFO will determine whether the undertaking will result in the Harmful Alteration, Disruption or Destruction ("HADD") of fish habitat, an action which may only occur if authorized by the Minister. In anticipation that a HADD will be identified by DFO, Hydro has already started a process to consider concepts for compensation measures within the Project area and, hence, incorporate such measures into the overall construction program schedule. This work is being undertaken well in advance of the environmental assessment.

The footprint of the Project will include areas of physical disturbance such as quarries. The inventory of available rock material adjacent to the two construction sites has taken into account the requirements for reducing the size of the Project footprint and the need for site rehabilitation. Favoured sites are locations that will be within the reservoir zone once the Project is in operation.

3.2.2 Environmental Protection Planning

Environmental protection planning has been an integral part of Hydro construction, operations and maintenance programs since the late 1970s. An Environmental Protection Plan (EPP) is important for consolidating environmental information in a format that provides sufficient detail for the implementation of environmental protection measures on site during construction. An EPP provides concise instructions to personnel regarding protection procedures and descriptions of techniques to reduce potential environmental effects associated with any construction activity.

The main objectives of Hydro's Standard EPP are to:

- consolidate information for planning;
- ensure environmental standards are current;
- provide details of Hydro's commitment to environmental protection and planning; and
- provide guidelines for field activities and decision making on environmental issues relevant to Hydro's construction, operations and maintenance activities.

An EPP has been developed and is being implemented for the Project environmental baseline studies. This EPP addresses issues relating to hunting and fishing, field policies, environmental orientation, storage and handling of fuel, waste disposal, vessel operation, encounters with wildlife, discovery of historic resources, spills, and forest fires.

Depending on construction sequencing, one or several activity-specific EPPs will be prepared and implemented for Project construction. Each EPP will be a field-useable document, addressing provisions that will reduce or avoid environmental effects associated with construction activities. As appropriate, each EPP will include items relating to vegetation clearing, grubbing and grading, storage and handling of fuel, blasting, quarrying, dust control, waste and sewage disposal, work in water, contingency plans for unplanned events such as spills, rehabilitation, and compliance monitoring.

3.2.3 Safety, Health and Environmental Emergency Response Plan

Given the complex nature of activities associated with the construction, operation and maintenance of a hydroelectric project, an accidental release or other unplanned event is a possible, but unlikely, event. Hydro proactively identifies potential emergency situations and develops response procedures, including Safety, Health and Environmental Emergency Response Plans (SHERP). The purpose of a SHERP is to identify Hydro's responsibilities in the event of an unplanned incident including the accidental release of oil or other hazardous material, on-site or during transportation, and to provide the information required for the effective response and reporting of such an incident. Hydro will conform to both provincial and federal legislation with the intent of meeting both its legal and corporate responsibilities.

The establishment and maintenance of emergency response procedures allows for:

- protection and maintenance of human health and safety;
- identification of the potential for accidents and emergency situations;
- planned response to accidents and emergency situations; and

- prevention and mitigation of potential environmental effects associated with accidents and emergency situations.

A SHERP was developed and is being implemented for environmental baseline studies. Depending on construction sequencing, one or several site/activity-specific SHERPs will be prepared and implemented for the Project. The Project-specific SHERP will address roles and responsibilities, personal protective equipment, materials storage, driving safety, working at heights, working near or over water, working near or on ice, vessel operation and safety, animal encounters, emergency response communications, spill response, personnel injury response, search and rescue, fire and explosion response, and vehicle/vessel accidents.

3.3 The Project

The Project consists of hydroelectric generating facilities at Gull Island and Muskrat Falls, and interconnecting transmission lines to the existing Labrador grid. The Project will be the subject of engineering design and marketing studies that will be conducted concurrently with the environmental assessment. As part of the environmental assessment, alternative means of carrying out the Project will be evaluated including its capacity, design, layout, and technology. The Project as currently planned is presented and, as with any project, will require optimization to reflect current market and business opportunities. Nevertheless, the Project will be very similar to previous concepts. Optimization will determine details such as the size and number of turbines within each powerhouse, and construction sequencing pending access to the south side of the river. Such changes and refinements will be relatively slight, and consistent with the normal process leading to final Project sanction.

The Gull Island facility will consist of a generating station with a capacity of approximately 2,000 MW and include:

- a dam 99 m high and 1,315 m long: and
- a reservoir 200 km² in area at an assumed full supply level of 125 m asl.

The dam will be a central till-cored, rock-fill, zone embankment. The reservoir will be 225 km long, and the area of inundated land will be 85 km² at full supply level. The powerhouse will contain four to six Francis turbines.

The Muskrat Falls facility will consist of a generating station that will be approximately 800 MW in capacity and will include:

- a concrete dam with two sections on the north and south abutments of the river, and
- a 107 km² reservoir at an assumed full supply level of 39 m asl.

The north section dam will be 32 m high and 180 m long, while the south section will be 29 m high and 370 m long. The north section will serve as a spillway in extreme precipitation events. The reservoir will be 60 km long and the area of inundated land will be 36 km² at full supply level. The powerhouse will contain four to five propeller or Kaplan turbines, or a combination of both.

The interconnecting transmission lines will consist of:

- a 735 kV transmission line between Gull Island and Churchill Falls; and,
- two 230 kV transmission lines between Muskrat Falls and Gull Island.

The 735 kV transmission line will be 203 km long and the 230 kV transmission lines will be 60 km long. Both lines will likely be lattice-type steel structures. The location of the transmission lines will be north of the Churchill River; the final route is the subject of a route selection study that will be included in the environmental assessment. The lines between Muskrat Falls and Gull Island may be on separate towers, or combined on double-circuit structures.

Conceptual illustrations of the Gull Island and Muskrat Falls generating facilities are presented in Figures 3.1 and 3.2. Typical transmission line tower structures are illustrated in Figure 3.3.

A general overview of the Project is presented in Figure 3.4.

Figure 3.1 Conceptual Illustration of the Gull Island Generating Facility

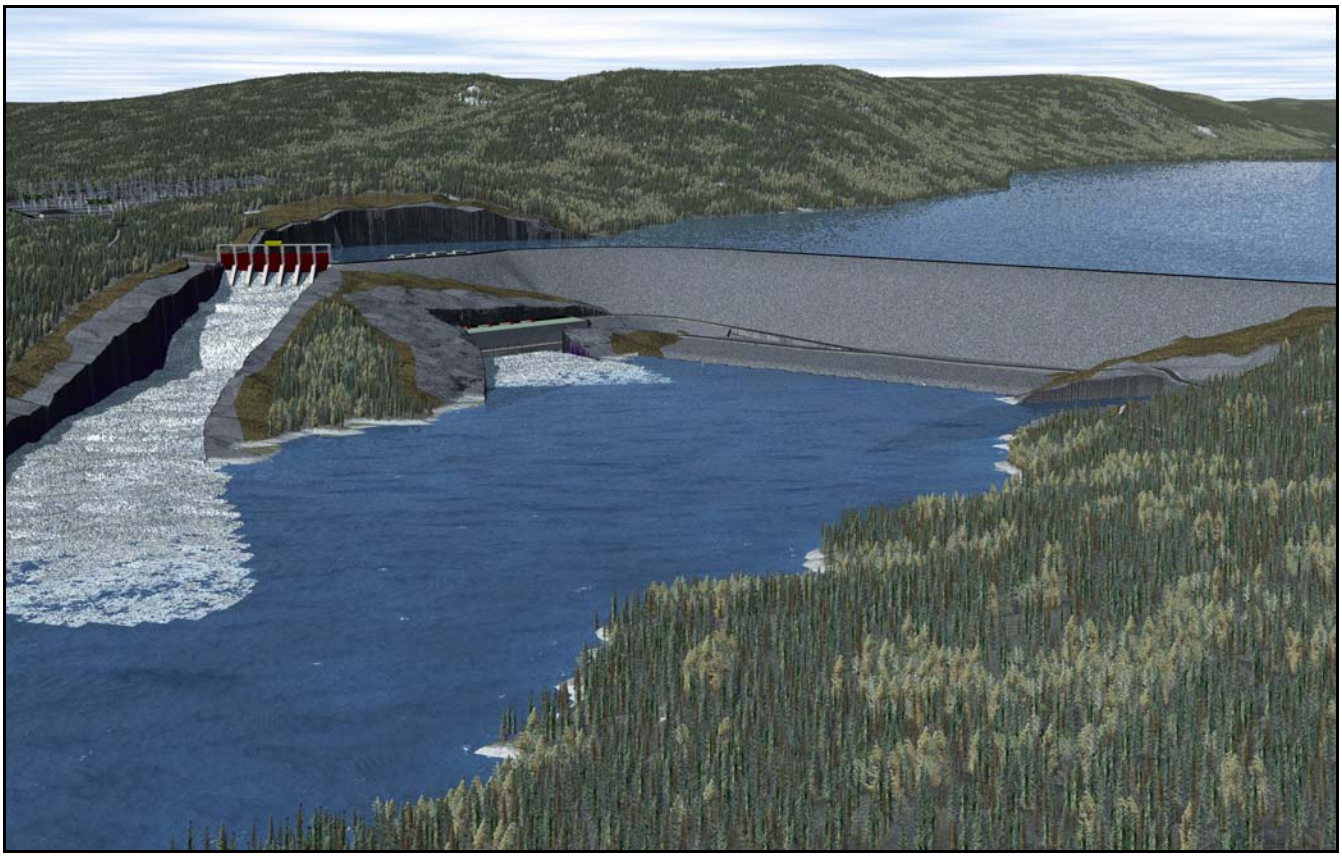


Figure 3.2 Conceptual Illustration of the Muskrat Falls Generating Facility

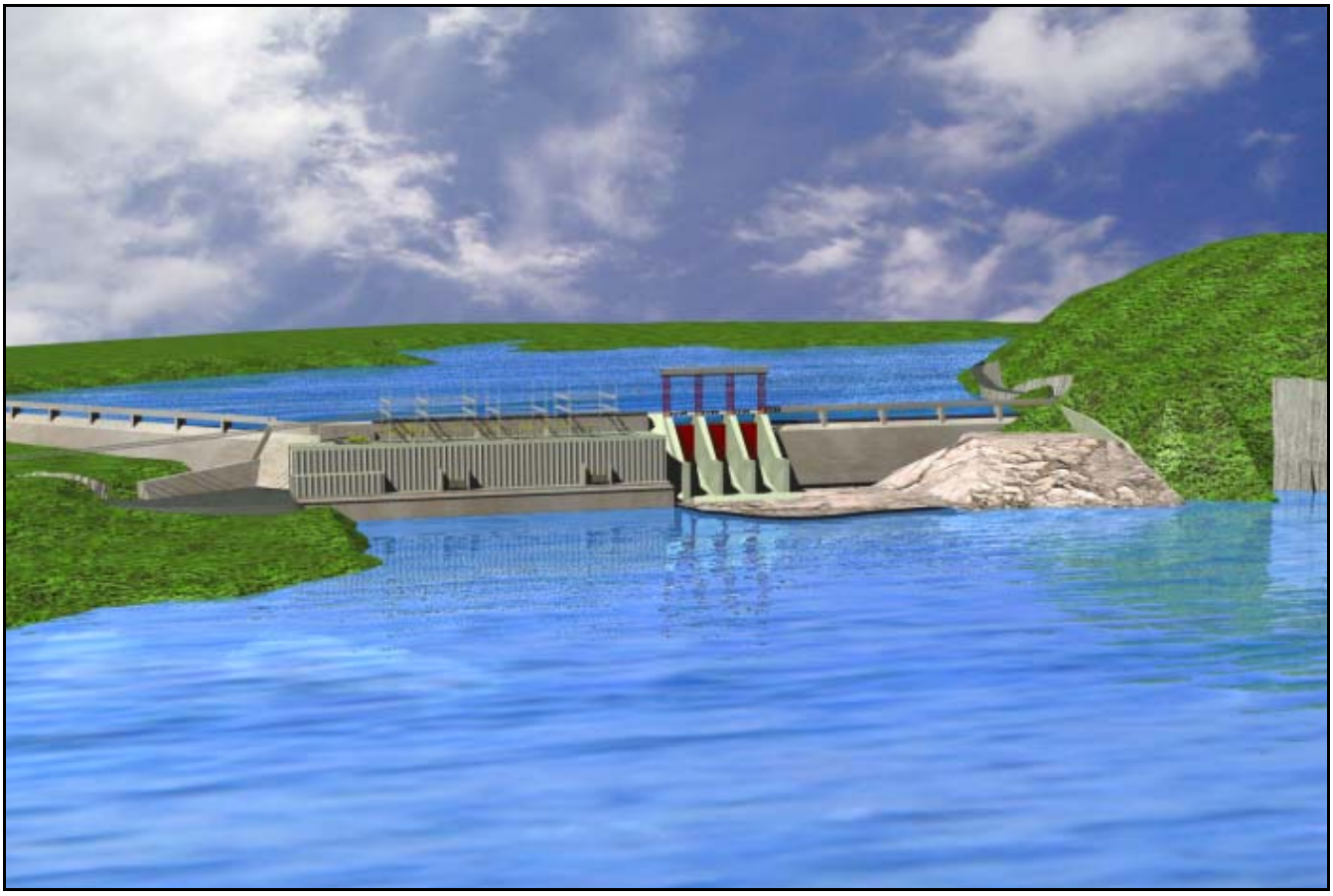


Figure 3.3 Typical Tower for 230 and 735 kV Transmission Line

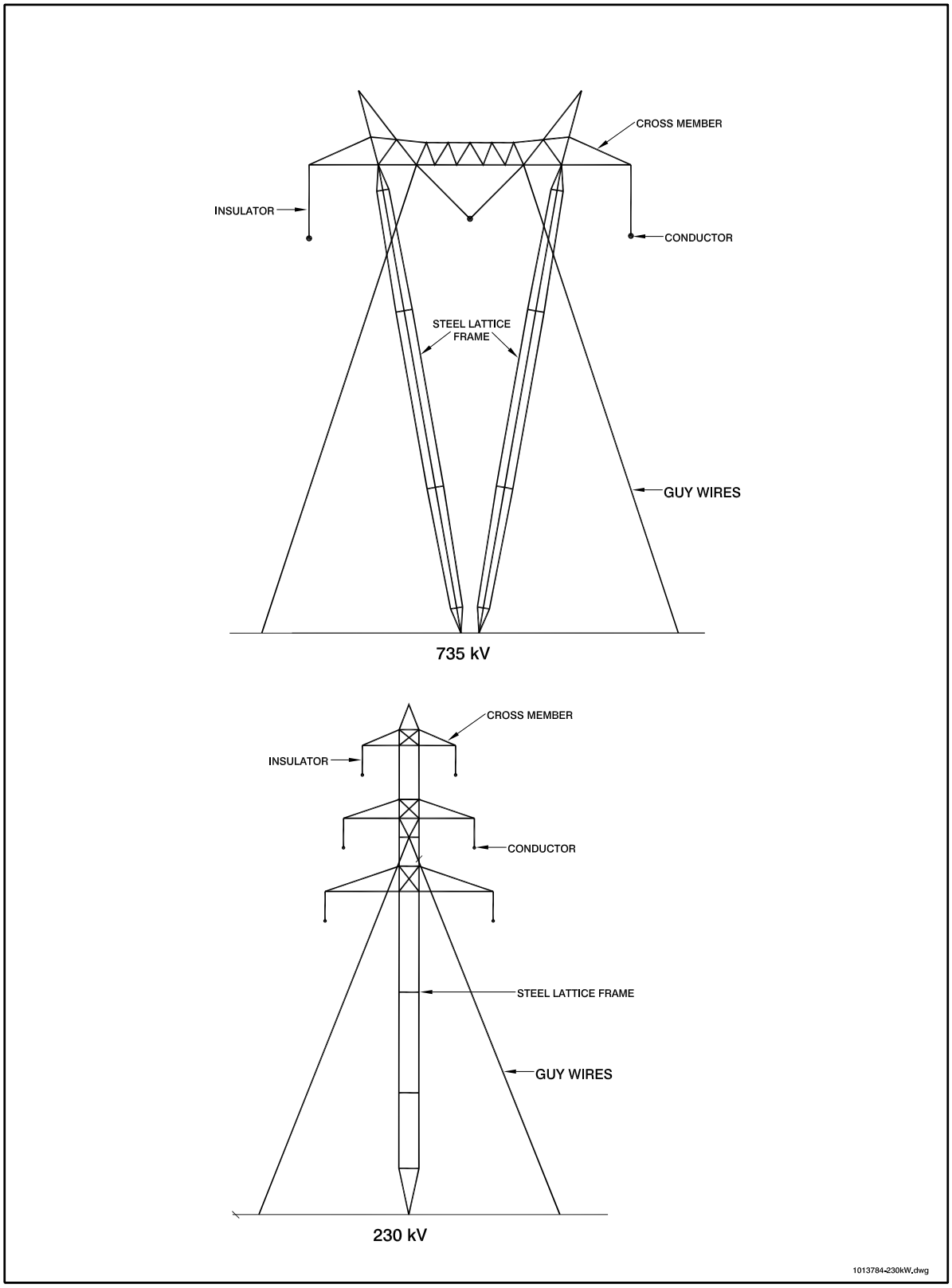
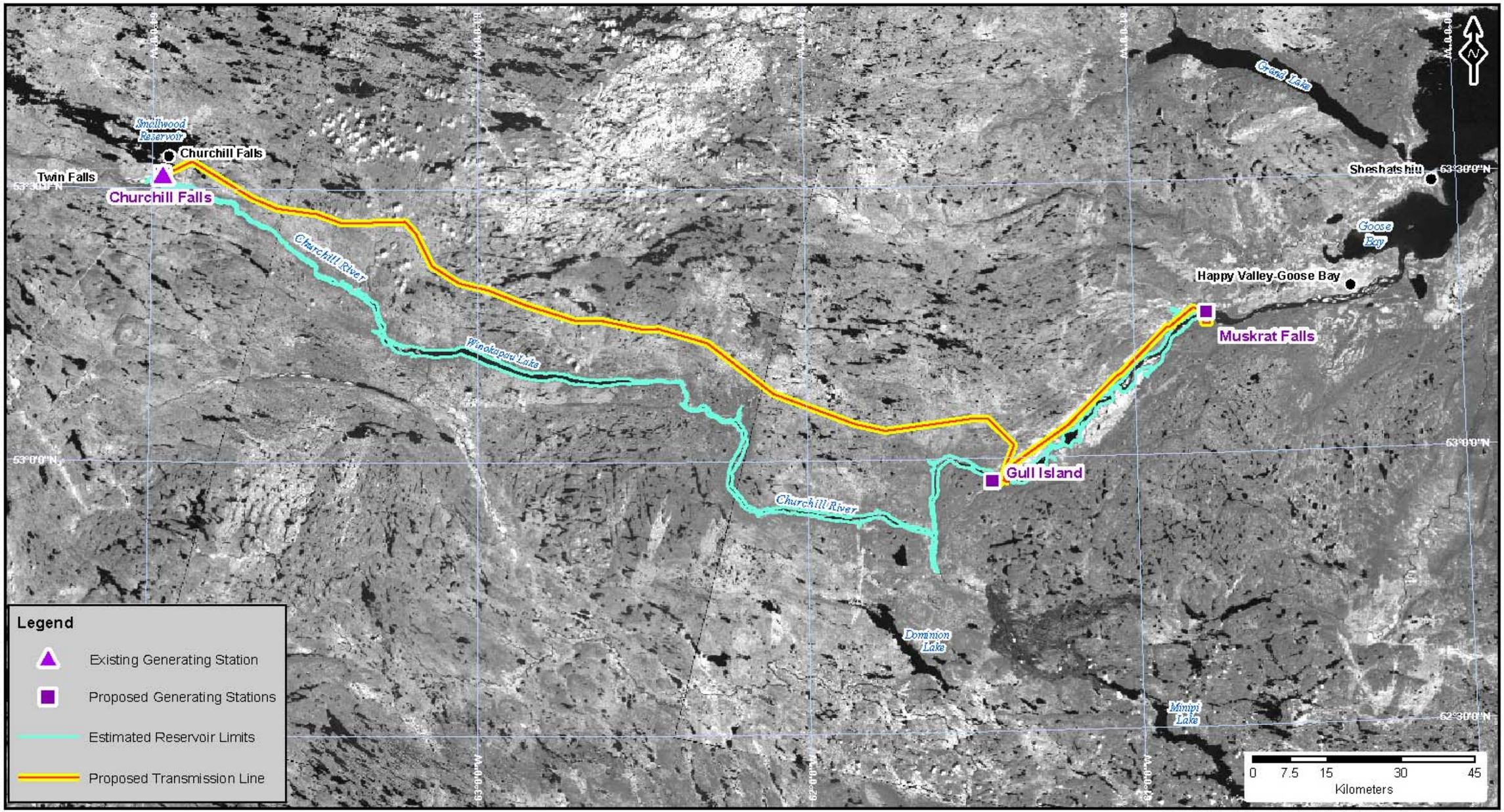


Figure 3.4 Limits of Proposed Reservoir and Transmission Line Corridor



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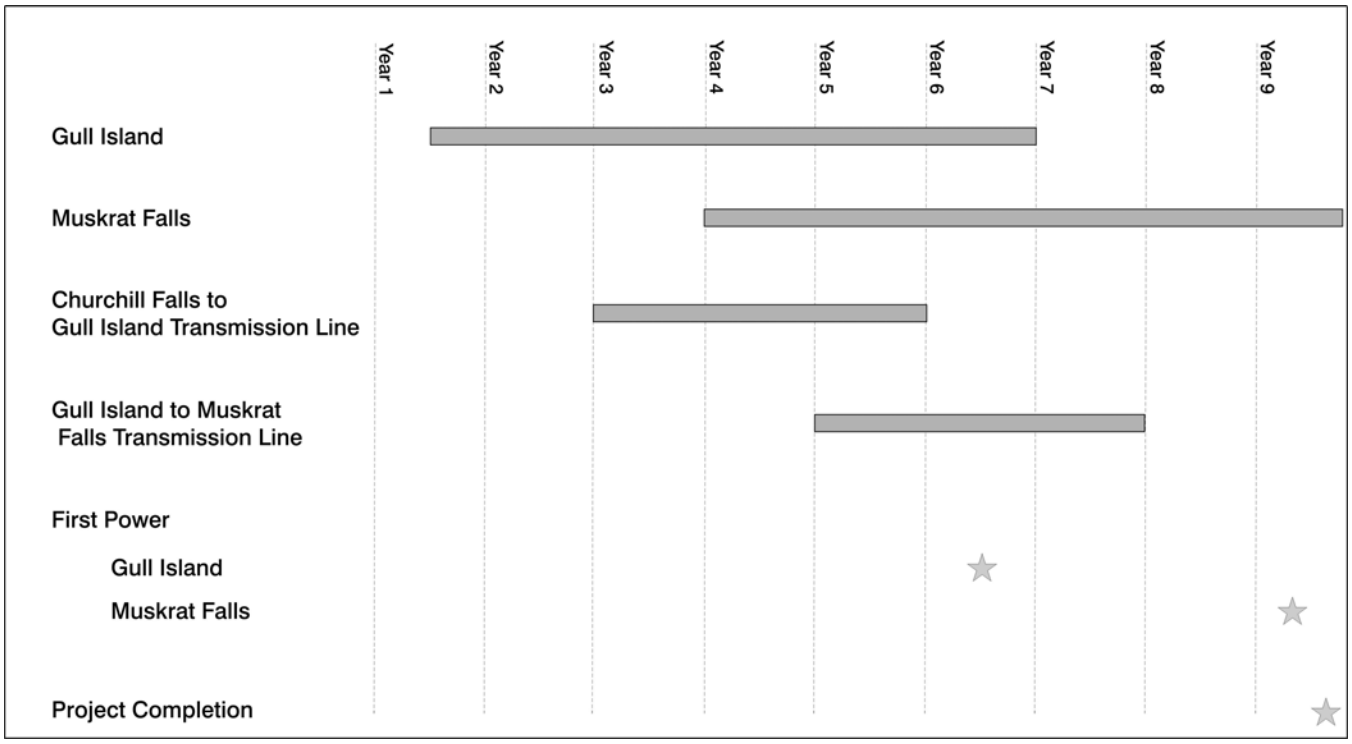
3.4 Schedule

Construction is scheduled to begin in 2009 and will last approximately nine years. The Gull Island facility will be completed at the end of Year 6. The Muskrat Falls facility will be completed at the end of Year 9 at which time the Project will be fully operational. The interconnecting transmission lines will be constructed from Year 3 to Year 7. The construction schedule is presented in Figure 3.5.

Figure 3.5 Lower Churchill Hydroelectric Generation Project Construction Schedule



3.5 Facilities Components and Layout

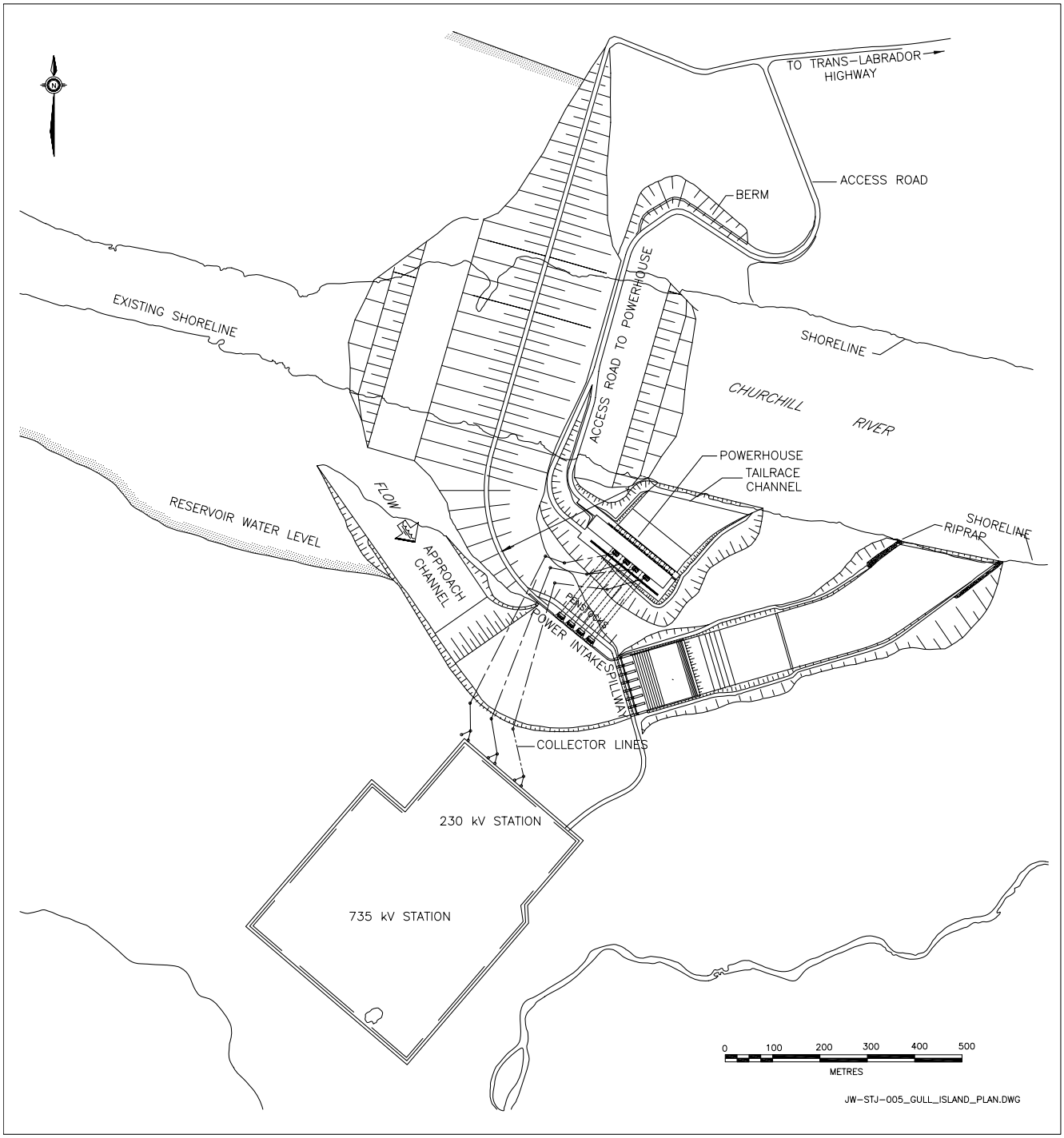
The description in this section is based on previous studies. A higher level of detail will be available from ongoing engineering studies prior to the completion of the environmental assessment.

3.5.1 Generation

Gull Island

The Gull Island facility includes construction of a dam on the Churchill River that will create a reservoir upstream of the structure. A conceptual layout of the facility is shown in Figure 3.6. Facilities will include a dam, spillway, and powerhouse. Water will be routed through an approach channel on the south bank of the river into intake and spillway structures. The powerhouse will be supplied with water through underground penstocks, from the intake. The 200 m long, 53 m wide powerhouse will be constructed at the foot of the dam.

Figure 3.6 Conceptual Gull Island Layout



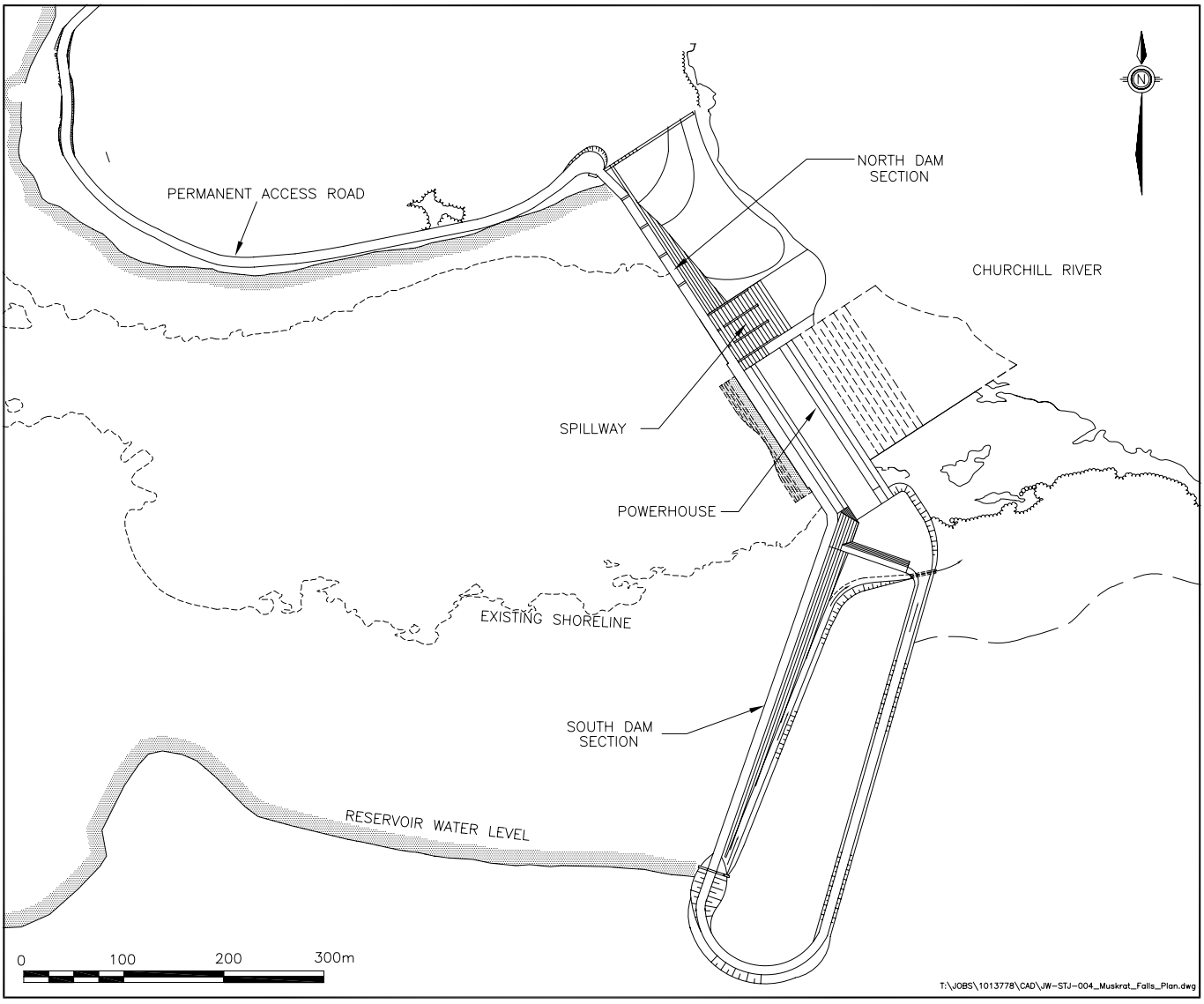
The rock fill dam will be constructed at the head of Grizzle Rapids, approximately 1.2 km upstream from Gull Lake. The river is approximately 470 m wide at the dam location. A net head of approximately 84 m will be obtained with an earth and rockfill dam 99 m in height. The dam will have a crest elevation of 129 m asl and a crest length of 1,315 m.

The 200 km² reservoir will have live storage of 580 million m^3. It will take approximately one month to fill and will be approximately 225 km long by 0.9 to 1.2 km wide, with a full supply level of 125 m asl. Inundation will be confined to the narrow river gorge between Gull Island and Churchill Falls and the total area of land that will be inundated, at full supply level, will be approximately 85 km².

Muskrat Falls

A general layout of the facility is shown in Figure 3.7. The powerhouse will be located in the dam at the centre of the river channel, with a gated spillway along the south bank of the Churchill River. The powerhouse will be 188 m long by 70 m wide. The concrete dam will consist of a north and south section with the powerhouse between the two. The north section will be approximately 180 m long and 32 m high, whereas the south section will be approximately 370 m long and 29 m high.

Figure 3.7 Conceptual Muskrat Falls Layout



The normal full reservoir level will be approximately 39 m asl, giving a gross head for generation of 36.1 m. The reservoir will extend to the Gull Island tailrace, and will be approximately 107 km², of which approximately 36 km² will be inundated land. It will take several days to fill the reservoir, which will have live storage of 0.5 million m^3.

3.5.2 Transmission

Associated with the generating facilities will be the following transmission components:

- two 230 kV transmission lines between Muskrat Falls and Gull Island; and
- one 735 kV transmission line from Gull Island to Churchill Falls.

Transmission lines will, for the most part, be constructed with guyed-vee type steel towers and require a cleared right-of-way of 50-80 m. It will take a total of five years to construct the lines.

The electrical output of the Gull Island powerhouse will be carried to power transformers, sited on a rock berm just upstream. Outgoing collector lines will carry the energy to the Gull Island switchyard, which will be located approximately 1 km south of the powerhouse.

The 203 km line between Gull Island and Churchill Falls switchyards will follow a relatively direct route, along the north side of the Churchill River generally following the existing 138 kV transmission line between Happy Valley-Goose Bay and Churchill Falls. The towers will be approximately 50 m high, with 500 m spans, and a clearance above ground of 18 m over roads and 14 m over other areas.

The 60 km line between Muskrat Falls and Gull Island will generally follow the existing 138 kV transmission line. The towers will be approximately 40 m high, with 380 m (average) spans, and a clearance above ground of 7.3 m over roads and 6.7 m over other areas.

Detailed routing will be determined through a comprehensive route selection process (Section 3.8.1).

3.6 Construction

Proven construction techniques will be employed for all aspects of the Project. Conventional civil construction equipment will be deployed. Except for the manufacture of specialized equipment (e.g., turbines, transformers) most of the construction activity will occur in the Project area.

3.6.1 Gull Island

The general layout at Gull Island is illustrated in Figure 3.6.

The site can be accessed from Happy Valley-Goose Bay via the TLH. An existing 10 km long access road from the TLH will be upgraded. One delivery route is to ship equipment through the port at Happy Valley-Goose Bay and then to the Project site by road. During the winter months, when the port is not operational, an alternate will be available through the Québec North Shore and Labrador Railway from Sept-Îles to an unloading/marshaling area near Ross Bay Junction, followed by approximately 370 km of road from Ross Bay Junction to Gull Island. Year-round vehicular access is also available from the Québec North Shore region (Baie Comeau), through Labrador City via the TLH, to the Gull Island site.

Electricity requirements during construction will be obtained from a local substation, which will be connected to the existing 138 kV transmission line on the north side of the Churchill River. Diesel backup generators will also be used.

To enable construction of the dam, the river will be diverted through twin tunnels driven through the rock on the north bank of the river. Following completion of the dam, these tunnels will be sealed with heavy gates and plugged with concrete.

The expected construction sequence at Gull Island will be:

- access;
- construction camp and site clearing
- diversion tunnels and cofferdams;
- main dam;
- spillway;
- intake, penstocks, and powerhouse;
- impounding; and
- rehabilitation.

Access

An existing 10 km long access road from the TLH will be upgraded to accommodate heavy-load construction vehicles. Temporary construction roads will be required to access work sites and quarries, including an access road from the construction camp area to the south bank of the river via a temporary bridge at the upstream end of Gull Lake. A testing protocol will be developed and applied to determine acid generation potential for exposed rock surfaces for all excavations.

Diversion Tunnels and Cofferdams

River diversion during construction will be carried out by passing flows through two tunnels excavated through the north bank with inlet and outlet channels. The river will be diverted by constructing cofferdams upstream and downstream of the dam foundation.

The cofferdams will be constructed of rock fill, with dumped and placed glacial till providing an impervious layer. Rock-filled groins, which will become part of the cofferdams, will be constructed to enable final closure of the river. The upstream cofferdam will have a crest length of approximately 555 m; the downstream cofferdam will have a crest length of approximately 450 m. The upstream cofferdam will be incorporated into the main dam.

Main Dam

The main dam will be an earth and rockfill zone embankment. Seepage through the dam will be controlled by a central impervious till core. Seepage beneath the dam, in the riverbed section, will be controlled by a concrete cut-off wall extending to bedrock and, along the north and south abutments, by a core trench carried down to bedrock.

Once the area between the cofferdams has been dewatered, excavation of the river bed will start for the main dam. The rate of construction of the dam will be governed by the rate of placing the till core. Work on the dam is scheduled to be completed in Year 5.

In Years 3 and 4, the dam rock fill will come primarily from excavation of the spillway and diversion tunnels. In Year 5, most rock fill will be drawn from rock stockpiles located on the south bank of the river. Very little quarrying is anticipated, since rock excavation balances well with the requirements for rockfill and crushed stone.

Spillway

The spillway will consist of concrete set in rock. The spillway includes an approach channel which will also serve to route flow to the power intakes, a vertical lift gate type spillway structure, and a long chute to dissipate kinetic energy and return the spilled flow to the river.

Work on the approach channel excavation will start in Year 1 with the removal of overburden. The initial rock cuts will start in the downstream area of the spillway and proceed toward the spillway and intake structures. Rock will be excavated from the approach channel and spillway. Most of the rock being excavated during this period will be stockpiled and used in constructing the main dam. Excavation will continue for three years. Concreting of the spillway structure will start in Year 4. Gates will be installed in Years 4 and 5.

The concreting for the spillway headworks will be completed in Year 4, to be ready for the start of gate installation. The concreting of the flip bucket and the downstream trailing walls will also be completed at this time. The downstream cofferdam will be breached and removed, ready for potential spilling in Year 5.

Intake, Penstocks and Powerhouse

The power intake will consist of 4 to 6 reinforced concrete bellmouth structures at the side of the unlined intake channel. The intake structures will be completed during the summer season of Year 4. The intake gates will be installed and tested, and trash racks will be installed in Year 5.

Each penstock will consist of a rock tunnel excavated between the intake and powerhouse. The upstream section will be concrete lined and the downstream section will be steel lined. Concreting of the penstocks and excavation for the powerhouse will be completed in Year 2. Penstocks will be excavated conventionally and no access adits will be required.

A cofferdam will be required to permit excavation in the tailrace area. This cofferdam will remain in place until Year 5, when it will be removed prior to flooding the tailrace.

Concreting of the powerhouse will follow standard methods. Concreting of the service bay will be completed in time to enable the structural steel and overhead crane to be erected and operational by Year 3. Turbine installation and completion of the powerhouse concrete work is scheduled for Year 4. Gates will be installed for the units, ready for breaching the tailrace cofferdam in Year 5.

Most of the rockfill and rock aggregate required for the Project will come from the structure excavations. Additional rock can be obtained from local sources. Impervious and granular materials will be excavated from local sources.

Impounding

The final construction step will involve the removal of the cofferdam, or plug, at the tailrace exit and concreting of the diversion tunnel plugs after the diversion closure gates have been dropped into place. Once impounding starts, the reservoir will reach the full supply level in approximately one month. After the diversion tunnel is closed, any excess flows will be passed through the spillway.

Rehabilitation

Rehabilitation of work site, quarries and borrow pits will be in accordance with Rehabilitation Plans which will address the following activities:

- limiting terrain, soil and vegetation disturbance to the absolute minimum required to complete the work;
- stockpiling overburden separately from any excess excavated rock and reserving it for use in future rehabilitation;
- stabilizing disturbed surfaces on an ongoing basis where possible to promote natural revegetation and limit erosion;
- dismantling and removing all surface infrastructure associated with work camps and source material areas;
- establishing permanent drainage patterns through contouring, which will also reduce erosion;
- encouraging natural revegetation of disturbed surfaces where applicable and conducting active revegetation where required and appropriate (i.e., soil and terrain conditions permitting);
- promoting natural revegetation of access roads;
- shaping any remaining excavated rock piles to maintain a natural slope and covering the top with topsoil and encouraging natural revegetation; and,
- conducting periodic inspections subsequent to decommissioning and abandonment of work camp and source material areas to measure the success of the rehabilitation measures.

3.6.2 Muskrat Falls

The general layout at Muskrat Falls is illustrated in Figure 3.7.

The site can be accessed from Happy Valley-Goose Bay using the TLH and an existing 3 km long access road which will be upgraded and extended. One delivery route is to ship equipment through the port at Happy Valley-Goose Bay and then to the Project site by road. During the winter months, when the port is not operational, an alternate existing route will be available through the Québec North Shore and Labrador Railway from Sept-Îles to an unloading/marshaling area near Ross Bay Junction, followed by trucking from Ross Bay Junction to Muskrat Falls. Year-round vehicular access is also available from the Québec North Shore region (Baie Comeau), through Labrador City via the TLH, to the Muskrat Falls site.

Electricity requirements during construction will be obtained from an existing local substation, which will be connected to the existing 138 kV transmission line on the north side of the Churchill River. A new transformer will be required for full construction power. Diesel backup generators will also be used.

The expected construction sequence at Muskrat Falls will be:

- access, construction camp, site clearing and excavation;
- diversion;
- intake/powerhouse;

- spillway and north dam section;
- south dam section;
- reservoir impounding; and
- rehabilitation.

Access

There is an existing 3 km access road from the TLH, which will be upgraded and extended an additional 1.8 km to the end of the north dam section. Various temporary construction roads will be required to access work areas or quarries. There may also be an access road to the south bank via the existing TLH causeway. Clearing and excavation of overburden material will be required at the construction site. A testing protocol will be developed and applied to determine acid generation potential for exposed rock surfaces for all excavations.

Diversion

The requirement for diversion tunnels is being assessed. With access to the south side of the river being available, a diversion tunnel may not be required. If diversion tunnels are required, they will run approximately east to west. Two 15 by 20 m inverted "U"-cross-section tunnels would be excavated on the north bank of the river. Due to restricted space between the intake channel and the south bank, the cofferdam would be made of two rockfill dykes with material in between.

Intake and Powerhouse

The intakes will be located directly adjacent to (upstream of) the powerhouse. Control gates will be located at the intake structure. Water will be conveyed in penstocks from the intakes to the turbines in the powerhouse. Control gates will be located at the intake structure.

The surface powerhouse will be approximately 188 m long and 70 m wide.

Spillway and North Dam Section

An overflow dam and constructed spillway will be designed to accommodate excess water flows. The spillway structure will be located between the north dam section (the overflow dam) and south dam section, abutting the dam section on the north side. The spillway concreting will start in Year 7 and be completed in Year 8.

The north dam section can be constructed before the spillway is completed. It will be built using roller compacted concrete (RCC).

South Dam Section

The south dam section will be a concrete gravity overflow structure founded on rock. The dam will extend from the service bay of the powerhouse to the south abutment. It will be constructed in Year 6. The outer downstream slope will be slightly steeper compared to the upstream slope.

Impounding

The final construction step will involve of the removal of the tailrace rockplug and the various cofferdams, and the construction and grouting of concrete plugs in the diversion tunnels (if required) after the diversion closure gates have been dropped into place and the water in the tunnels have

drained to the normal tailrace water level. After diversion tunnel closure, any excess flows will be released through the spillway. Filling the Muskrat reservoir will take several days.

Rehabilitation

The work site, quarries and borrow pits will be rehabilitated as described for Gull Island in Section 3.6.1.

3.6.3 Transmission Lines

The right-of-way will be cleared of all vegetation that exceeds 1 m at maturity. Clearing methods will be determined by the type of vegetation to be removed. Clearing specifications will take into account:

- location and identification of watercourse crossings along the right-of-way;
- widths and depths of watercourses;
- location and depth of wetlands;
- types of bridges and culverts required to cross watercourses;
- areas of commercially valuable timber and the method of cutting and storing the harvested timber;
- disposal of non-commercial timber and vegetation;
- required buffer zones along watercourses and at sensitive areas;
- special clearing requirements; and
- location of roads required to bypass zones of difficult access in the right-of-way.

An access road will be constructed along the cleared right-of-way, or as close to it as possible. Construction of the transmission line will include:

- distribution of components along the right-of-way;
- installation of foundations and guy anchors;
- pull-out testing of guy anchors;
- fabrication of guys;
- assembly of towers complete with guys, insulators and travelers;
- erection of towers, including the connection of the guys to the guy anchors;
- tensioning the guys;
- preparation of work sites for the conductor pulling and tensioning equipment;
- installation, sagging and clipping of shieldwires and conductors; installation of spacer-dampers;
- installation of counterpoise; removal of camps, bridges and culverts; and
- clean up and restoration of the right-of-way.

3.6.4 Construction Work Force

The projected peak construction workforce will be approximately 2,000. The estimated peak numbers of each trade over the construction phase of both generation facilities and transmission lines are listed in Table 3.1.

Table 3.1 Construction Work Force by Trade

NOC Code	Title	Peak #	NOC Code	Title	Peak #
212	Architecture and Science Managers	1	7219	Cont/Spvrs Others Construction	51
632	Accommodations Service Managers	12	7271	Carpenters	107
711	Construction Managers	31	7241	Electricians	39
721	Facility Operations Managers	10	7244	Electricians - Power Line and able	35
1111	Financial Auditors and Accountants	8	7246	Telecomms Installers/Repair	1
1121	Human Resources Specialists	6	7252	Steam/Pipefitters	41
1221	Administration Officers	3	7263	Metal Workers	28
1241	Administration Assistants	10	7264	Ironworkers	76
1411	General Office Clerks	16	7265	Welders	38
1432	Payroll Clerks	15	7281	Bricklayers	3
1471	Shipper and Receivers	11	7282	Cement Finishers	7
2131	Civil Engineer	38	7284	Plasterers	9
2132	Mechanical Engineers	2	7311	Millwrights/Mechanics	62
2133	Electrical Engineers	3	7312	Heavy Duty Equipment Mechanics	17
2121	Biologists and Related Scientists	2	7318	Elevator Mechanics	14
2154	Land Surveyors	4	7321	Motor Vehicle Technicians/Mechanics	32
2221	Biological Technicians	16	7351	Stationary Engineers and Operators	172
2234	Estimators	8	7371	Crane Operators	60
2253	Drafting Technicians	8	7372	Drillers and Blasters, Mining/Quarry	69
2254	Survey Technicians	26	7411	Truck Drivers	253
2263	Occupational Health and Safety Inspectors	8	7412	Bus Drivers	12
2264	Construction Inspectors	11	7414	Delivery Drivers	108
2271	Pilots, Flight Engineers	1	7421	Heavy Equipment Operators	145
3152	Registered Nurses	3	7452	Material Handlers	44
6242	Cooks	39	7611	Construction Trades Helpers/Labourers	464
6453	Food and Beverage Servers	5	8211	Supervisors, Logging and Forestry	25
7211	Spvrs Machinists	13	8231	Miners	7
7213	Cont/Spvrs Pipefitting	8	8241	Logging Machinery Operators	40
7214	Cont/Spvrs Metalworkers	21	8421	Chainsaw and Skidder Workers	60
7215	Cont/Spvrs Carpentry	37	8422	Silviculture and Forestry Workers	40
7216	Cont/Spvrs Mechanics	13	8616	Logging and Forestry Labourers	60
7217	Cont/Spvrs Heavy Construction Equipment	51			

3.6.5 Construction Camps

Accommodations for most of the construction labour force will be required. Therefore, construction camps are being planned at the Gull Island and Muskrat Falls sites. The construction camp at Gull Island will be developed in a previously cleared area approximately 5 km from the Gull Island site. The construction camp at Muskrat Falls will be located between the TLH and the Churchill River, on the west side of the access road. They will include living quarters and recreational, security and safety amenities. Accommodations will consist of dormitory units based on single occupancy rooms.

Transmission line construction crews will be accommodated at existing facilities in Churchill Falls and the Gull Island camp. One additional satellite construction camp will be required along the Gull Island

to Churchill Falls Transmission Line route. It will contain 8 to 12 person accommodation units, a kitchen diner and a recreation module.

3.7 Operation and Maintenance

The Project will be operated on a continuous basis, with a maximum of 3 m fluctuation in the reservoir water levels upstream from Gull Island, and a maximum of 0.5 m fluctuation in the reservoir upstream of Muskrat Falls.

The facilities will be operated for an indeterminate time and decommissioning is not contemplated. Gull Island will be operated at a full supply level of 125 m asl and Muskrat Falls will be operated at a full supply level of approximately 39 m asl. Regular maintenance will be scheduled to avoid complete shutdown.

A profile of the Churchill River from Churchill Falls to the mouth of Lake Melville is presented in Figure 3.8, showing the water elevation with and without the Project. A series of cross-sections are shown in Figure 3.9 to illustrate the extent of inundation within the river valley in relation to existing water levels.

Camp accommodations will be available for work crews. A small operational staff will work on a rotational basis; therefore, there will be no permanent accommodations at either site.

Transmission lines will be inspected on an annual rotational basis, with a portion of the line being inspected each year. The inspections will be done by air or from the ground on All Terrain Vehicles. Vegetation management will be conducted every 5 – 10 years.

Figure 3.8 Profile of the Lower Section of Churchill River with and without the Project

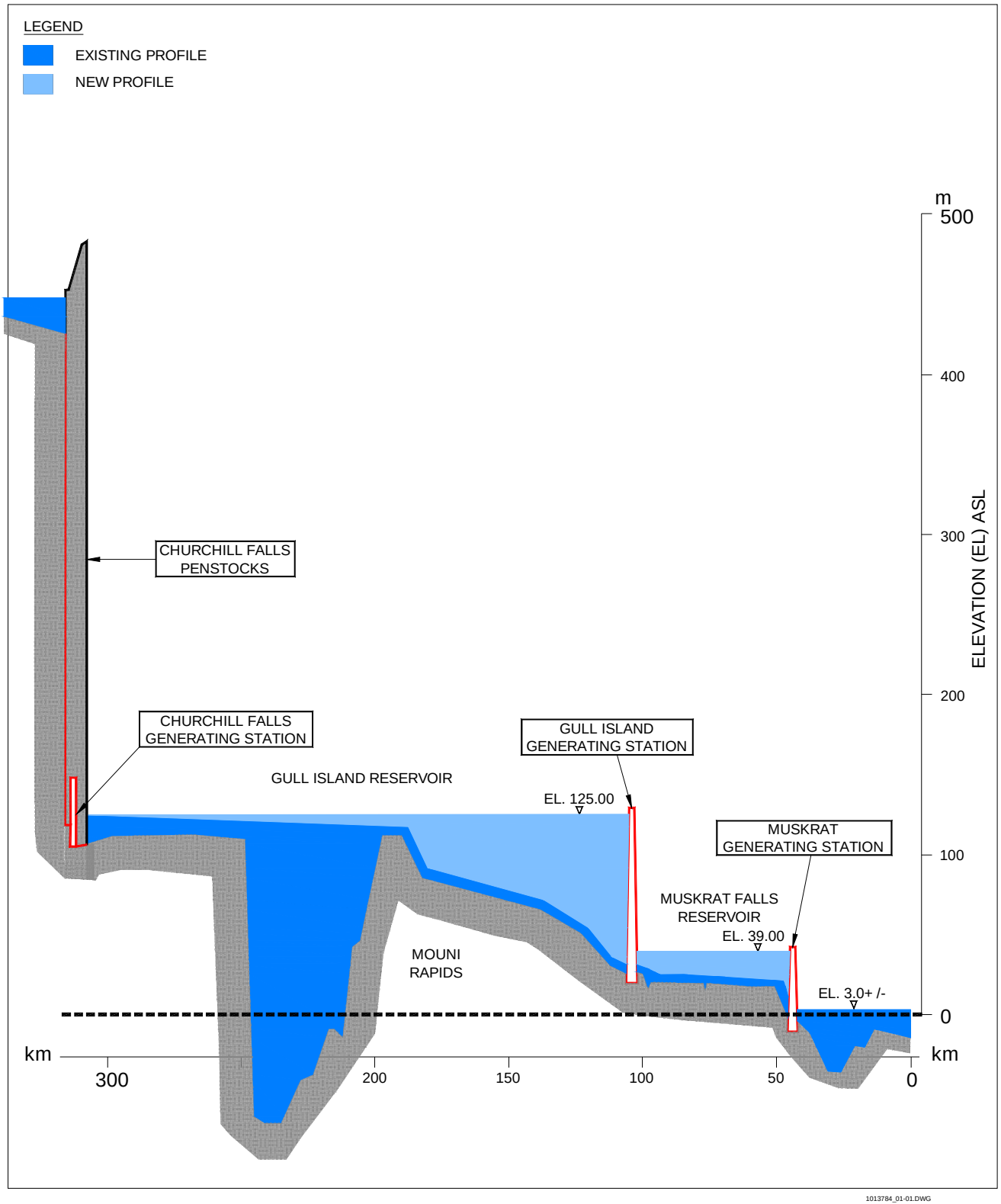
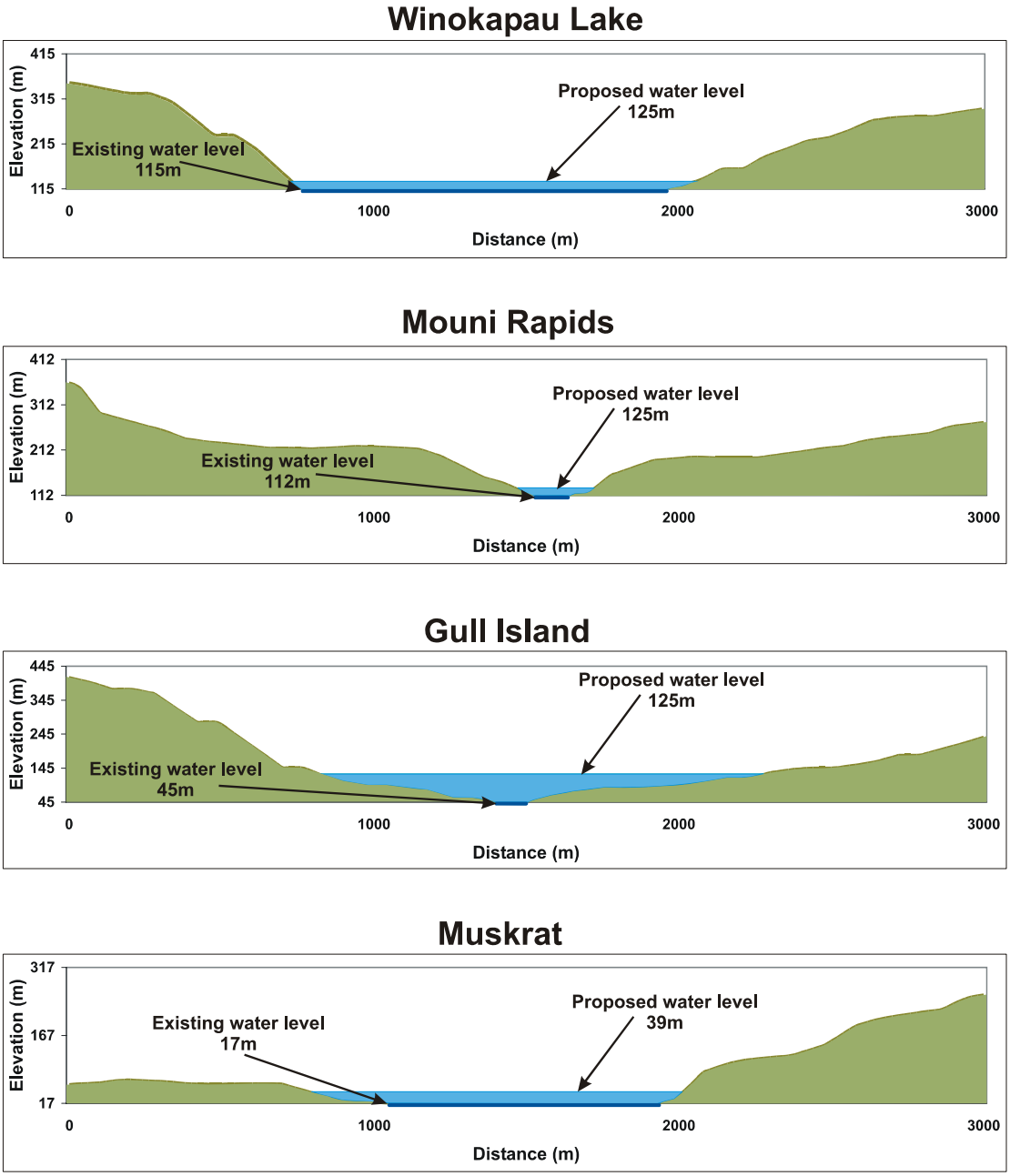
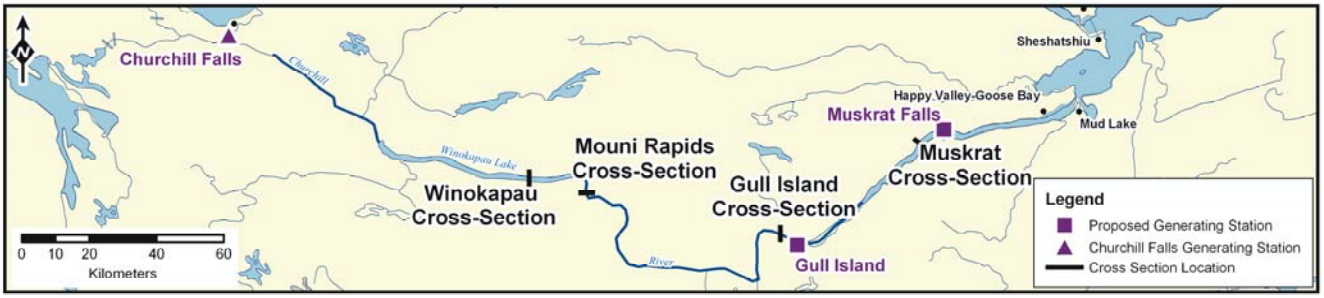


Figure 3.9 Selected Cross-sections Looking Upstream of the Churchill River with and without the Project





3.8 Alternative Means of Carrying out the Project

The overall objective of the Project is to develop and optimize energy production of the hydroelectric resources of the lower section of the Churchill River at Gull Island and Muskrat Falls. Hydro has extensively evaluated alternate sites, configurations, and operating regimes for the Project in the context of this objective, using technical and economic criteria. These evaluations will be confirmed in the market feasibility and engineering design studies that are being undertaken concurrently with the environmental assessment. Technical criteria include hydrotechnical and geotechnical constraints and constructability. Economic criteria include considerations such as capital cost, market requirements and the optimization of energy generation. Previous study has confirmed that the Gull Island and Muskrat Falls locations are the only technically and economically feasible sites for the facilities. As has been noted, there are a number of alternative means to construct the Project at the selected sites (e.g., diversion tunnels at the Muskrat Falls site, number of turbines at Gull Island). Alternatives for which a single technically and economically feasible option has not been determined will be examined in the environmental assessment.

Consistent with the requirements of *CEAA*, economically and technically feasible alternatives only will be considered in the environmental assessment.

3.8.1 Site and Route Selection

The site of a hydroelectric project is defined by a number of interrelated elements: abundant rainfall and consequent water flow; suitable geomorphological features that permit water to be contained and controlled; and sufficient head. Therefore, there is often limited choice for the location of powerhouses and dams and the configuration of reservoirs. The proposed facilities at Gull Island and Muskrat Falls have been reviewed several times in detailed engineering studies and the proposed locations for the generating facilities have not changed. There are no feasible alternatives for siting the generation facilities.

Transmission line routes are selected by evaluating technical, environmental, socio-economic, cultural and economic criteria. Corridors north of the Churchill River, approximately 5 to 10 km wide will be selected for the interconnecting transmission lines based on these criteria. Detailed route selection within the corridor will be conducted using the same criteria and reported in the environmental assessment. The results of resource inventories will be applied to the route selection process.

3.8.2 Gull Island

The Gull Island site has been the subject of many studies dating back to the mid-1960s, resulting in the finalization of the location at a site approximately 100 km west of Goose Bay between Gull Island Rapids and Grizzle Rapids, just upstream of Gull Lake on the Churchill River. Previous engineering feasibility has confirmed this is the only site where the generation of hydroelectric power is feasible. No other sites are being considered. The selected layout (spillway structure and powerhouse on the south bank and the tunnel diversion on the north bank) is preferred based on economic (e.g., cost and schedule) and technical (e.g., constructability, river morphology, geotechnical constraints) criteria. The reservoir full supply elevation of 125 m asl was selected in previous feasibility studies so the water level in the tailrace of the Churchill Falls Generating Station would not be affected.

3.8.3 Muskrat Falls

The Muskrat Falls site has been the subject of many engineering studies dating back to 1965. Similar to the Gull Island site, this is the only site where the generation of hydroelectric power has been determined to be feasible. No other sites are being considered. Various development lay-outs have been examined since the mid-1960s. The preferred alternative of previous studies was chosen based on technical and economic criteria. Road construction in the region has led to an expanded system and a new bridge across the Churchill River approximately 20 km downstream of the Muskrat Falls site. This results in the possibility of accessing the south shore of the river at the start of construction. Such access may preclude the need for diversion tunnels during construction. The reservoir elevation of 39 m asl has been planned so that the water level of the Gull Island tailrace will not be affected.

3.9 Emissions and Discharges

Potential emissions and discharges during construction will be limited to those for a typical construction project, i.e., vehicle and equipment air emissions (contaminants and noise), and site runoff with suspended solids. During operation, there is little potential for unplanned emissions and discharges associated with the Project.

3.9.1 Construction

Emissions and discharges will result mainly from the operation of quarries and borrow pits, motor vehicles and heavy equipment and the campsite. Hydro's EMS will be implemented to manage and control construction waste, discharges, and emissions. Site and activity-specific EPPs and SHERPs will be developed and implemented to manage waste materials, pollutants, and health and safety. All Hydro and contractor staff will comply with provisions of the EPP and SHERP.

Borrow operations can result in the generation of fine (silt) material, which can enter watercourses. Drainage will be controlled to reduce the flow of water through borrow areas. Vegetated buffer zones will be maintained around borrow operations. Rock crushing and gravel washing operations will include holding lagoons to precipitate suspended particles.

The handling and use of fuels, oil and lubricants will be carefully controlled. A dyked fuel storage depot will be established at each site for bulk petroleum products. Contractors will be responsible for transportation of their own fuel from the site depot.

Batch plants for concrete production will be established at each site, and will be located and operated in accordance with applicable guidelines and conditions of permits. The batch plants will be set back a minimum of 50 m from water bodies. Measures will be implemented to prevent the entry of silt-bearing drainage or wash water to freshwater bodies. These will include constructed sediment ponds and/or installation of silt curtains, and will include pH adjustment, if necessary.

Engine exhausts will generate air emissions whose makeup will depend on the type of emission control devices and nature of the fuel. Both diesel and gasoline powered equipment and vehicles will be used on site. Other air emissions include heated air produced by machinery used to dry till and for heating of work areas. Project emissions will include particulate matter, the by-products of combustion of hydrocarbon fuel, and noise.

The maintenance and feeding of the work force will produce garbage, which will be sorted prior to disposal on a daily basis. Non-food will be disposed in an approved landfill site. To reduce the incursion of nuisance bears, a bear management plan will be prepared and implemented by Hydro. It will include awareness education as well as measures to ensure the proper handling, storage and disposal of all food wastes. Sanitary waste will be treated in accordance with applicable legislation.

3.9.2 Operation

The operation of the Project will result in the production of almost no waste material. Water passed through the turbines will be returned immediately to the river without the addition of pollutant or other waste material. A small-scale sewage system will be incorporated into each plant for the workers.

Cooling Water

A small volume of heated cooling water (16C° above ambient) will be produced from some of the moving parts. The quantities of discharged cooling water will be minimal in relation to the volume of water to be passed through the powerhouse.

Drainage

Oil-water separators equipped with alarms will be installed at each powerhouse. All seepage and leakage from the turbine and separator pits will enter floor drains that will discharge into the separators. Clean drain water will discharge into the tailrace.

Fire Protection System

Fire protection for the generators and governors will be a sprinkler system with water supplied from the penstock. Fire hoses will be provided in the powerhouse on each floor and in the service bay. Dry chemical and CO_2 extinguishers will be provided as necessary to meet service areas and control room needs. Fire pumps and a jockey pump with pressure control systems will be connected to the station service and backed up by a diesel generator. Inergen fire protection will be provided in the terminal, communication and battery rooms.

Domestic Water

Domestic water for both facilities will come from the penstocks or from artesian wells. The system will include water treatment if appropriate.

Sanitary Systems

Sanitary waste will be disposed in accordance with applicable legislation. All relevant permits will be obtained (Appendix B).

Oil Storage and Handling

Limited oil storage handling facilities will be provided for make-up oil to be used in the turbine/generator bearings and governors. Oil will be handled by barrel or by a portable tank. Clean and dirty oil tanks and oil purifying filter units, with oil handling pumps, will be provided. The filtering units will be portable, and may be used at any unit as well as in the oil storage areas. Clean and used oil tanks will also be provided for transformer oil purifying.

Vegetation Management

An integrated Vegetation Management Program will be prepared and implemented for control of vegetation along the right-of-way for the transmission lines. Vegetation will be controlled manually, or by application of vegetation-control agents or a combination of the two. All vegetation management activities will be undertaken subject to approval from the Department of Environment and Conservation and in compliance with the *Pesticides Control Regulations*. As is standard practice, Hydro will provide public notification and conduct an evaluation of environmental sensitivities where herbicides are to be used. Vegetation control personnel will be trained and qualified.

3.10 Potential Resource Conflicts

Current resource use within the Project area includes trapping, hunting, wood cutting, and recreational activities such as boating, berry-picking, and angling. Tourism is being promoted and outfitters operate in the region. The construction phase of the Project will interact with these resource uses where they occur within the Project footprint.

For safety and security purposes, access to the generating facilities will be restricted during operations. Potential resource conflicts may result from restricted access at the footprint of the two generating facilities. Other resource conflicts may result from changes to the flow regime of the lower Churchill River through creation of reservoirs, and changes in wildlife travel patterns related to transmission line corridors. Potential effects will be addressed in the environmental assessment.

3.11 Approvals and Permits

A list of permits, authorizations, and approvals that may be required for the Project is presented in Appendix B.

4.0 EXISTING INFORMATION

CEAA provides for the inclusion of existing environmental assessment studies in the conduct of new environmental assessments, as appropriate. Dedicated studies for a proposed hydroelectric development at Gull Island and Muskrat Falls were first conducted in 1978-1979, in support of an environmental assessment Panel Review. Further studies for a proposed hydroelectric development at Gull Island and Muskrat Falls were conducted in 1998, and for Gull Island only in 1999 and 2000 in anticipation of an environmental assessment for the Churchill River Power Project. In addition, there have been numerous studies and data collection efforts in the general vicinity of the Project, some of which include relevant descriptive material.

4.1 Lower Churchill Project - Panel Review 1979-80

An EIS was prepared for the Lower Churchill Hydroelectric Development under the Federal Environmental Assessment and Review Process, and in accordance with requirements of Newfoundland and Labrador. The process included the appointment of a federal-provincial Panel. The development was presented as two projects – Generation (Gull Island and Muskrat Falls) and Transmission (HVDC interconnection to the Island of Newfoundland), as proposed by the LCDC. The Panel issued guidelines in 1979. Twenty-nine component studies were prepared from 1979 to 1980 (Appendix A), as supporting documents to the EIS, which was formally submitted to the Panel in April 1980. LCDC also conducted a public consultation program, holding public meetings in nine communities and establishing a Liaison Committee in Happy Valley-Goose Bay. Formal Panel Hearings were held in the fall of 1980. The Panel considered a wide array of issues, most of which remain relevant. Specific recommendations were made to address the potentially adverse environmental effects. Overall, the Panel recommended that the project be approved. The project was released (with conditions) from environmental assessment in December 1980; however, it did not proceed at that time due to energy marketing and project economics.

4.2 Lower Churchill Project - 1991

A renewed effort to develop the Lower Churchill was initiated in 1990 and resulted in a registration of the undertaking in 1991 in accordance with the Newfoundland *Environmental Assessment Act.* A comprehensive review of existing information was conducted; however, there were no baseline studies undertaken at that time. The project did not proceed due to market conditions.

4.3 Churchill River Power Project - 1998 to 2001

The Labrador Hydro Project ("LHP") office was established in 1998 to plan and develop the Churchill River Power Project ("CRPP"). Several configurations were considered including diversions from within Quebec to the upper Churchill River watershed, and generating facilities at Gull Island and Muskrat Falls. The LHP mandate included environmental assessment planning, project engineering and economics, negotiations with Innu Nation, Innu consultation, and baseline data collection. Hydro Quebec was a joint partner at the initial planning stages of CRPP, but later withdrew from this arrangement. Through Process Agreements, Innu Nation conducted a community consultation

process, negotiated towards an IBA, and participated in a joint Task Force on project (including environmental) planning. The project did not proceed due to energy marketing and project economics.

Thirty-five baseline studies were conducted from 1998 to 2000 in support of the CRPP (Appendix A).

4.4 Other Relevant Studies

Several large environmental assessments have been completed in Labrador. Some of the associated component studies (baseline and monitoring) provide information that is relevant and can be used for characterizing the Project area.

The Department of National Defence ("DND") conducted an environmental assessment of low-level flight training based at 5 Wing Goose Bay, Labrador. The Institute for Environmental Monitoring and Research ("IEMR") has been responsible for on-going monitoring studies that were prescribed as a condition of release from the environmental assessment. These studies include the assessment of the behaviour and distribution of animal and bird species, some of which occur in the Project area. Social and economic effects on the Upper Lake Melville region have also been studied.

The Trans Labrador Highway ("TLH") has been planned and constructed in three phases, each of which has gone through environmental assessment. The recent TLH Phase 3 (Cartwright to Happy Valley – Goose Bay) environmental assessment included a series of biophysical, archaeological and socio-economic studies including Aboriginal and non-Aboriginal resource and land use. The geographic extent of these studies included a portion of the Project area,

While the Voisey's Bay Mine/Mill site is distant from the Project area, the Upper Lake Melville area serves as an important connection point for that project. Consequently, socio-economic studies included this region as well as a part of the Labrador Innu Land Claim Area. Other relevant studies included migratory species and large mammals, whose range extends to the Project area, and regional Ecological Land Classification.

5.0 ISSUES

An issue scoping exercise for a previous proposal to develop the hydroelectric potential of the lower Churchill River was conducted during the federal environmental assessment in 1979-1980. More recently, Hydro also undertook issues scoping in 1998 to 2001, which involved technical experts, government agencies, and Innu Nation. Issues have also been identified through media reports and other meetings related to the Project, and through provincial energy planning. These current and past efforts have served to identify the scope of studies currently underway.

5.1 Issues Identification

Hydro has a good understanding of the potential issues related to the Project. These are described below. It is expected these will be further refined and addressed through the environmental assessment process.

5.1.1 Labrador Innu Society and Culture

The Project is located within the Land Claim Area of the Labrador Innu and has the potential to result in both beneficial and adverse effects on Innu society and culture. Hydro is working with Innu Nation and Innu communities to engage them in the construction and operation phases of the Project. Potential effects of the Project on Innu society and culture, land use, economy, labour force and health will be considered in the environmental assessment.

5.1.2 River Flow

Hydrological changes, (*i.e*., the changes in water volume and velocity) will result from the Project and could affect processes of ice formation and break-out, water quality, sediment transport and riverbed movements (including bank stability, slumping and sand bar movements). Such physical changes could affect areas within the reservoirs as well as extending to the mouth of the Churchill River. Secondary concerns would include effects on boat and snowmobile travel, riparian vegetation development, estuary mixing phenomena, and river shoreline erosion.

5.1.3 Fish and Fish Habitat

Fish and fish habitat will be affected by the planned development of the Project reservoirs, and possibly through construction practices. The array of species currently present in the mainstem and accessible tributaries fulfill all their lifecycle needs within the Project area. The Project will change the quantity of aquatic habitat through inundation, and may affect habitat character through alterations in water velocity. Productive fish habitat which will be altered, disrupted or destroyed as a consequence of the Project will be the subject of compensation to meet the requirements of the “No Net Loss” policy as established by Fisheries and Oceans Canada. Any acceptable compensation plan will need to take into account the value placed on the fish resource by users of that resource, including Aboriginal people, and recreational fishers.

5.1.4 Terrestrial Habitat, Wildlife and Birds

Reservoir formation will result in the inundation of terrestrial habitat along the length of the lower Churchill River valley, especially downstream of Winokapau Lake (see Figure 3.9). The riparian zone within the relatively sheltered river valley provides habitat for many terrestrial species including waterfowl, raptors, songbirds, small mammals, furbearers, and large mammals. The habitat of the Churchill River valley serves a variety of lifecycle needs, including breeding, nesting, feeding, migration, and over-wintering. The new shoreline will take some time to develop, and there will be a loss in the total available terrestrial habitat. The temporal and spatial features of these changes will need to be understood at the population level to predict effects on wildlife and birds, and to identify possible mitigation measures. Terrestrial resource harvesting may also be affected.

5.1.5 Mercury

Reservoir formation will change the natural patterns of mercury uptake into the aquatic environment. The potential food chain pathways include accumulation in fish species and consequent human consumption. Predictive models are available and will be employed to identify the extent, levels and duration of mercury uptake through the food chain as a consequence of reservoir formation and operation.

5.1.6 Reservoir Preparation

Inundation will remove access to the forest resources and other terrestrial vegetation within the newly formed reservoirs. Inundation of vegetation will be of concern with respect to aesthetics, resource use of the waterway and valley, recovery of wood fibre, the sequestration and release of carbon dioxide, and mercury uptake. A selection of reservoir preparation strategies may address these concerns, but each has its own economic, technical and environmental considerations which need to be evaluated to select the most appropriate mitigation measures.

5.1.7 Vegetation

The Project will affect vegetation within the limits of the reservoir, along the newly developed shorelines, within the construction areas footprint around the generation sites, and along the transmission routes. In addition to providing wildlife habitat, these areas support a variety of vegetation types and plant species, some of which are consumed or used by people, and some which are regarded as having intrinsic value related to scarcity, uniqueness or other considerations.

5.1.8 Historic Resources

Inundation and construction activities will or have the potential to disturb or destroy archaeological sites and other historic resources in the Project area. Historic resources are protected under provincial legislation and valued by Aboriginal and other people in the province. For Aboriginal people, archaeological sites represent the physical archives of their history. The Churchill River valley has been extensively surveyed over four field seasons to locate and identify historic resources that will or may potentially be affected by the Project. Key issues will be to determine the precise interactions between the Project and historic resources gather and record information contained in archaeological

sites that would be lost as a result of the development, and to develop mitigation and protection measures for implementation in the event an historic resource is discovered.

5.1.9 Communities and Infrastructure

The Project, through construction and operation, will have a direct effect on proximate communities and Project workers. The Project demand for labour, goods and services will provide employment and business opportunities for the local region, as well as Labrador, the Province and, to a lesser extent, the country. These effects will be most noticeable during the nine-year construction phase. Economic effects will include secondary (spin-off) employment, as well as other secondary effects which may result from the injection of a large labour force into an area. Upon the completion of construction, there will be a downturn, commonly referred to as a "boom-bust" phenomenon. Local community infrastructure and public services will experience increased demands as a consequence of this heightened level of economic activity. Effects will extend to a range of community features, including education, health services, law enforcement, recreation, leisure and culture.

5.1.10 Climate Change and Greenhouse Gases

The Project has the potential to contribute positively to the reduction of greenhouse gases, and thereby act as a factor which reduces climate change. Nevertheless, some aspect of the Project will generate greenhouse gases (e.g. construction equipment, the new reservoirs). These will need to be quantified and incorporated into the overall calculation of the greenhouse gas balance achieved by the Project.

5.1.11 Employment and Contracting Policies

Employment and contracting with respect to the Project is of interest to Aboriginal groups, governments, and public interest groups. Hydro will consider and establish policies, practices and initiatives regarding employment and contracting opportunities for Aboriginal people, women, persons with physical disabilities, visible minorities and their businesses. Employment policies will address such topics as information and communications, employee recruitment and selection, employee development, and workplace environments. Contracting policies will address such topics as contractor development, procurement processes and requirements, and the provision of information about Project requirements. Effective monitoring and feedback mechanisms will be put in place for employment and business equity. In the Labrador context, special efforts will be made to address cultural awareness and barriers to employment and business for Innu, and in particular, Innu women.

5.2 Treatment of Issues

There are a number of concepts that have been developed to capture and address important environmental issues. It is anticipated the environmental effects analyses of the identified issues and concerns will need to take place in the context of these concepts. These are presented and discussed below.

5.2.1 Sustainability Assurance

Sustainable development refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The Lower Churchill

Hydroelectric Generation Project will create a renewable, sustainable energy source; however in doing so, there will be a permanent loss of valley habitat and attendant effects on the environment. Hydro will address the identified environmental issues associated with the Project in the context of Sustainability Assurance and in a manner consistent with the principles of Sustainability Assurance as it applies to electric power generation.

5.2.2 Biological Diversity

Biological diversity or biodiversity refers to the total variety of all living things in an area or region. The concept includes genetic diversity among and within species, species diversity of life forms present in a specific region, and diversity of ecosystems in a region. The objective of biodiversity conservation can be addressed at all stages of environmental planning and impact assessment.

One important aspect of biodiversity is the preservation of species at risk. In Canada and Newfoundland and Labrador, legislation has been developed to address this concern. The *Species at Risk Act* ("*SARA"*) prohibits the killing, harming, harassing, capturing or taking species at risk (Schedule 1 of the Act), and the destruction of their critical habitats or residences. Similarly, the provincial *Endangered Species Act* ("*NLESA"*) prohibits the disturbing, killing, capture, possession or trading of designated species, or their residences. In developing its program of baseline studies, Hydro has incorporated consideration of *SARA* and the provincial *NLESA* by conducting surveys to identify the presence of species at risk in the Project area.

5.2.3 Precautionary Principle

This principle was defined in the 1992 Rio Declaration on Environment and Development. Hydro will apply appropriate and cost-effective actions to prevent serious or irreversible damage as a consequence of the Project. The lack of full scientific certainty regarding the probability of effects occurring will not be used as a reason for postponing mitigation measures.

5.2.4 Adjacency

People who reside close to a major undertaking are more likely to experience adverse environmental effects. For this reason, special efforts may be justified in order to deliver benefits to these people. As appropriate adjacency policies are defined, Hydro will apply these to the Project.

5.2.5 Traditional Knowledge

Aboriginal people have knowledge and an understanding of the environment that can provide an important perspective in the collection of baseline data, prediction of environmental effects and development of mitigation measures to address environmental effects. Aboriginal people and communities are the owners of this knowledge (often called Traditional Knowledge or Traditional Environmental Knowledge) and, as such, must participate in its collection and use in an environmental assessment. Hydro and Innu Nation have developed and initiated a process to discuss, document and consider Labrador Innu traditional knowledge in planning and conducting the environmental assessment of the Project. As appropriate, Innu traditional knowledge obtained through this process will be incorporated into the environmental assessment document in a manner that will be agreed between Hydro and Innu Nation.

5.3 Regulatory Compliance

Many issues of concern are addressed through law, regulation and public policy. In varying degrees this dictates the requirements for information collection and level or type of mitigation measures required. As a means of cross-reference, Hydro has developed a comprehensive list of regulatory permits and approvals associated with the Project (Appendix B).

The *Fisheries Act* prohibits the harmful alteration, disruption or destruction of fish habitat without the authorization of the Minister. Consequently, DFO has developed principles, policies and procedures to be followed as a prerequisite to any such approval. Hydro has been proactive in generating the required information and in anticipating the requirement for a Fish Habitat Compensation Plan. Thus, Hydro anticipates it will be able to describe a strategy to achieve fish habitat compensation as a component of the environmental assessment document.

Historic resources are protected in accordance with the Newfoundland and Labrador *Historic Resources Act*. The Regulations under the Act set standards for the conduct of archaeological surveys and require permits to be held by qualified archaeologists in the conduct of such surveys. When historic resources and artifacts are discovered, the legislation prescribes the procedures for recovery, archiving and preservation. Hydro is working cooperatively with the Provincial Archaeology Office in the conduct of archaeological surveys within the Project area.

Hydro has been diligent in complying with all identified regulatory requirements and processes associated with the work completed to date. All future regulatory compliance will be carried out in the context of a comprehensive series of EPPs described in Section 3.2.2.

5.4 Boundary Definition

The environmental assessment will need to define temporal, spatial and administrative boundaries that will apply to the Project and relate to the issues of concern. Precise biophysical boundaries can be identified; socio-economic boundaries will be larger, and less precise. The discussion below will assist in defining these boundaries.

The biophysical zone of influence of the Project will be generally confined to the footprint of the generating sites and their associated reservoirs during construction and operations. During operation, water flow in the river downstream of Muskrat Falls will not differ greatly from the current pattern. There may, nonetheless, be changes in river ice during break-up, since ice above Muskrat Falls will no longer pass downstream, but will melt in place. Upstream interactions are not contemplated beyond the tailrace at Churchill Falls Generating Station. Thus the boundaries with respect to biophysical issues will generally lie within the watershed of the lower Churchill River.

The communities which will be most affected by the Project are those in the Upper Lake Melville area – Happy Valley-Goose Bay, Sheshatshui, Northwest River and Mud Lake. Natuashish is distant from the Project area, but as an Innu community will likely feel environmental effects from the Project and will therefore be included within study area boundaries. The community of Churchill Falls includes recreational users of the watershed several of whom have cabins along the river.

The temporal boundaries of the Project will extend over a decade for construction and over an indeterminate timeframe during operations.

A summary presentation on the temporal, spatial and administrative boundaries as applicable to each of the identified issues is presented in Table 5.1.

Table 5.1 Proposed Boundaries for Identified Issues

Issue	Spatial Boundaries	Temporal Boundaries
Hydrology	Lower section of Churchill River from Churchill Falls to mouth of river	Life of Project
Fish and Fish Habitat	Lower section of Churchill River from Churchill Falls to mouth of river	Life of Project
Terrestrial Wildlife and Birds	Area adjacent to lower section of Churchill River; area cleared for transmission lines Spatial boundaries for game species will consider their respective management area. For example: ▪ Black Bear – Labrador South Black Bear Management Area ▪ Caribou – in accordance with Labrador Caribou Management Areas ▪ Furbearers – Labrador Eastern Furbearer Zone	Life of Project
Vegetation	Area adjacent to lower section of Churchill River; area cleared for transmission lines	Life of Project
Mercury	Reservoirs	10 to 20 years
Reservoir Preparation	Reservoirs	Construction phase
Historic Resources	Area to be inundated; areas to be cleared at generation sites and along transmission line rights-of-way	Construction phase
Communities and Infrastructure	Happy Valley-Goose Bay, Sheshatshui, Northwest River, Mud Lake, Natuashish, Churchill Falls	Life of Project
Innu Society and Culture	Lower section of Churchill River from Churchill Falls to mouth of river Transmission line rights-of-way	Life of Project
Employment and Contracting	Labrador	Life of Project
Climate Change and Greenhouse Gasses	Labrador	Life of Project

5.5 On-going Activities

Hydro has several initiatives in progress with respect to the environmental assessment, some of which are described below.

5.5.1 Innu Nation Consultation and Involvement

Hydro and Innu Nation have put in place various consultation processes and mechanisms for the Project (as described in detail in Section 1.5). These are established and implemented through Process Agreements signed between Hydro and Innu Nation, and are important means of ongoing communication and cooperation. Under the current Process Agreement, processes have been established to conduct Innu-led consultations on the Project in the communities of Sheshatshiu and Natuashish, to conduct negotiations towards an IBA which would define how the Innu might participate in and benefit from the Project, and to facilitate the direct participation of Innu in the environmental and technical work being carried out for the Project and in planning for and conducting its environmental assessment.

Each of these processes is designed to share information, both in terms of informing Innu Nation and the Innu communities about the Project, and in identifying and attempting to address questions, concerns and issues in the environmental assessment.

5.5.2 Environmental Baseline Studies

A broad program of environmental baseline studies are currently under way with respect to ecological land classification, aquatic and terrestrial habitat, wildlife, water/sediment quality, hydrology, historic resources, and socio-economic studies. As results become available, these will be incorporated into the environmental assessment.

5.5.3 Public Consultation

Public consultation will be an integral part of the environmental assessment of the Project. There will be opportunities at all stages for interested parties to bring forward their views and ask questions about the Project. The public consultation program will extend beyond the Project site in Labrador to the rest of the Province. The basic objectives of Hydro's public consultation program will be to provide timely and accurate information to interested stakeholders, and obtain feedback that will identify issues and concerns, and thereby focus the environmental assessment.

Hydro will consult with:

- persons or groups possessing data and information relevant to the Project, including government regulatory agencies, public groups, and individuals;
- those involved in decision-making associated with the Project; and
- those who may be affected by the Project through physical, social, cultural or economic changes.

Hydro is currently engaged in public consultation and issues scoping through ongoing discussions with government regulators, resource agencies, and researchers regarding the 2006 field programs. Consultation will continue with these groups, in addition to other stakeholders throughout the environmental assessment.

A variety of materials and approaches will be used to ensure full opportunity for all interested parties in Newfoundland and Labrador to participate in the environmental assessment. For example, open houses, key informant workshops, and directed stakeholder meetings or focus groups will be conducted at various locations; the Project website (www.nlh.nl.ca) will provide information on an ongoing basis; and Hydro will be available to make presentations to interested groups. Questions and concerns will be recorded at each interface, and Hydro will follow up as appropriate.

6.0 CORPORATE COMMITMENT

The Lower Churchill Hydroelectric Generation Project will include generation facilities at Gull Island and Muskrat Falls with an approximate total installed capacity of 2,800 MW, and interconnecting transmission lines to Churchill Falls. Hydro will secure funding for the Project. Given the Project's greenhouse gas reduction potential and its contribution to Canadian electricity supply, it is clearly in the national interest. Federal support for the Project was requested in the fall of 2005, and discussions with the federal government will continue over the coming months.

Hydro is anticipating that an environmental assessment will be required for this Project, with full opportunity for public and stakeholder review. Hydro is committed to completing a full and comprehensive environmental review in compliance with provincial and federal legislation. Potential environmental effects will be predicted using the extensive environmental baseline data collected over the last 30 years. Mitigations or optimization measures will be proposed to reduce the magnitude of adverse effects and enhance benefits. Follow-up monitoring will be designed and implemented.

The Project will follow the overall Hydro Environmental Management System to ensure it will be constructed and operated in a safe and environmentally-responsible manner. Environmental criteria will be incorporated into the Project design and construction sequencing through the preparation of Environmental Protection Plans and Safety, Health, and Environmental Emergency Response Plans.

Hydro will continue to work with Innu Nation to undertake consultation, conduct negotiations towards an Impacts and Benefits Agreement, and directly involve the Innu in associated environmental and technical work and in the environmental assessment of the Project

Hydro will ensure there are opportunities for interested parties to bring forward their views and ask questions about the Project, including relevant government departments, Aboriginal groups, stakeholder organizations and the interested public. Issues and concerns raised through scoping and consultation will be used to focus the environmental assessment.

The Project will provide benefits to the residents of Labrador and Newfoundland through job creation, provision of electrical power, and revenue generation. The development of a comprehensive environmental assessment will contribute significantly to that objective.

Signature

2006 11 30

Date

Name: Edmund J. Martin
Position: President and CEO

7.0 GLOSSARY

asl	Above sea level
Baseline Data	Information collected on the surrounding environment, typically before a project begins. Also called baseline information.
Baseline Study	Research conducted in the area/region typically before a project or development begins.
Bedrock	A general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material.
Boreal	Northern regions, but not arctic; related to, or comprising the northern biotic area characterized by dominance of coniferous forests.
CEAA	*Canadian Environmental Assessment Act*
CF(L)Co	Churchill Falls (Labrador) Corporation
CO_2	Carbon dioxide
Cofferdam	A barrier, usually temporary, constructed to exclude water from an area that is normally submerged. They are used to allow construction of the foundation of permanent dams, bridges, and similar structures. When a project is completed, the cofferdam is not needed and may be demolished or removed. They are commonly made of wood, concrete or steel sheet piling.
Coniferous Forest	Forest characterized by cone-bearing, needle-leaved trees such as spruce and pine.
Crown Corporation	A commercial company owned by the government, controlled and partially operated by civil servants.
DFO	Fisheries and Oceans Canada
Diversion Tunnels	Underground passageways used to re-route flowing water around a construction site.
DND	Department of National Defense
Ecosystem	A naturally occurring group of organisms (plant, animal and other living organisms) living together with their environment, functioning as a unit.
Ecozone	An ecological unit that can be distinguished by climate, landforms, soil units, plant formations and land use systems. An ecozone can be broken down into ecoregions.
Endangered	Description of a species that is in danger of extinction within all or part of its range (the region to which it is native).

Environmental Assessment	A planning process to predict the environmental effects of a proposed development before it is carried out.
Environmental Impact Statement (EIS)	A document which describes a proposed development or activity, predicts the possible or certain impacts of the activity on the environment, and outlines safeguards to mitigate or control environmentally destructive impacts.
NLEPA	Newfoundland and Labrador *Environmental Protection Act*
EPP	Environmental Protection Plan
NLESA	Newfoundland and Labrador *Endangered Species Act*
Flip bucket	A common addition to a spillway used to help discharge flow away from a hydraulic structure into a plunge pool to dissipate energy.
Follow-up	A program designed to verify the accuracy of the environmental assessment of a project, and determine the effectiveness of measures taken to mitigate the adverse environmental effects of a project.
Furbearer	Mammals hunted or trapped primarily for fur.
GBDF	Goose Bay Diversification Fund
Glaciation	Having been covered with a glacier or subject to glacial epochs.
Granite	Common, coarse-grained, light-colored, hard igneous rock consisting mainly of quartz, orthoclase or microcline, and mica, often used in monuments and for building.
Habitat	The place where an animal or plant lives, often characterized by some physical condition (e.g., stream habitat).
Head	The vertical distance between the surface of a reservoir and the surface of a river immediately downstream from the dam.
Hydrology	The study of the occurrence, circulation, distribution, and properties of water bodies including oceans, lakes, rivers and streams.
Hydro	Newfoundland and Labrador Hydro
IBA	Impacts and Benefits Agreement
IEMR	Institute for Environmental Monitoring and Research
ISO	International Standardization Organization
ISO 14001	The international standard for environmental management.
km	Kilometre
km^2	Square kilometre

kV	Kilovolts
l	Litre
LCDC	Lower Churchill Development Corporation
LMN	Labrador Metis Nation
m	Metre
m^3	Cubic metre
m^3/s	Cubic metre per second
Mitigation	A procedure designed to reduce the possible harmful effects of a project or activity on the environment. Also mitigative or mitigating measure.
MW	Megawatt
Operations Phase	The period following first power production until cessation of all activity.
Penstock	A pipeline that delivers water from a reservoir or a dam to a turbine.
Precambrian	A division of geological time older than approximately 600,000,000 years ago.
The Project	Lower Churchill Hydroelectric Generation Project
QMI	Quality Management Institute
RA	Responsible Authority
Reservoir	A pond, lake, or basin, either natural or artificial for the storage, regulation and control of water.
Roller Compacted Concrete (RCC)	A low slump concrete mix that is compacted in place with heavy construction equipment (trucks, bulldozers, compactors). Concrete forms are not required. Common for dam construction and other applications.
SARA	*Species at Risk Act*
Sediment	Particulate matter that can be transported by water, which eventually is deposited as a layer of solid particles on the bed or bottom of a body of water.
SHERP	Safety, Health and Environmental Emergency Response Plans.
Silt	A particle smaller than a very fine sand grain and larger than clay having a diameter in the range of 0.004 mm to 0.0625 mm.
Spillway	A channel that carries excess water from a reservoir over or around a dam or other obstruction.
Stakeholder	A person or group with an interest or concern with respect to a project or issue.

Tailrace	A watercourse that carries water away from a mill, waterwheel or turbine.
TLH	Trans Labrador Highway
Transmission Line	The wires and structures that conduct electricity.
Trash racks	Grate-like protection for water intakes, channels and penstocks against debris, vegetation, or trash.
TWh	TeraWatt Hour; equivalent to 1,000,000 MW hours.
Waterfowl	Freshwater aquatic birds, such as ducks or geese.
Watershed	The region or area drained by a river or stream; drainage area.
Wildlife	Undomesticated animals living in the wild, including those hunted for food, sport, or profit.

APPENDIX A

List of Existing Information/Previous Studies

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APPENDIX B

List of Permits, Authorizations and Approvals

List of Permits, Approvals and Authorizations that May be Required for the Lower Churchill Project

Government of Newfoundland and Labrador			
Activity	**Approval/Certificate/ License/Permit/Inspection**	**Legislation**	**Regulating Agency**
Project Construction/Commencement	Release from the Newfoundland and Labrador *Environmental Protection Act*, Part X, Environmental Assessment	Newfoundland and Labrador *Environmental Protection Act*, SNL 2002 c.E-14.2, Part X, Environmental Assessment	Environmental Assessment Division, Department of Environment and Conservation
Establishment of Work Camps	Septic System Commercial – Certificate of Approval for septic systems > 4,500 L per day - in an unserviced area and not covered under a Municipality	Newfoundland and Labrador *Health and Community Services Act*, SNL 1995 c.P-37.1; Sanitation Regulations 1996	Department of Health and Community Services
	Letter of Approval – Septic System	Newfoundland and *Labrador Health and Community Services Act*, SNL 1995, c.P37.1, Sanitation Regulations	Department of Health and Community Services
	Certificate of Approval for Commercial Building under National Building/Fire/Life Safety Code	*Fire Prevention Act,* SNL 1991 c.34, and the National Fire Code of Canada 1990	Department of Municipal Affairs (Office of the Fire Commissioner)
	Certificate of Approval for Buildings Accessibility Design Registration or Exemption Registration	Newfoundland and Labrador *Occupational Health and Safety Act,* RSNL 1990 c. 0-3	Department of Government Services
	Temporary Food Establishment Application	Newfoundland and Labrador *Food and Drug Act,* RSNL 1990 c.F-21, Food Premises Regulations	Department of Health and Community Services, Disease Control and Epidemiology Division
	Building Accessibility	*Building Accessibility Act*, RSNL 1990 c.R-10, Building Accessibility Regulations	Department of Government Services
Land Requirements	Crown Lands - Crown Land Lease/License/Permit	Newfoundland and Labrador *Lands Act*, SNL 1991 C.36	Department of Environment and Conservation
	Notice of Intent for Reservation of Shoreline	Newfoundland and Labrador *Lands Act*, SNL 1991 c.36	Department of Environment and Conservation
Waste Management Related to Construction Activities	Waste Oil - Handling and Disposal	Newfoundland and Labrador *Environmental Protection Act*, SNL 2002 c.E-14.2Used Oil Control Regulations	Department of Environment and Conservation
Garbage Disposal/Waste Management	Waste Management System, Certificate of Approval	Newfoundland and Labrador *Environmental Protection Act*, SNL 2002 c.E-14.2, Waste Disposal and Litter	Department of Environment and Conservation
Access Roads	Bridges, Certificate of Approval, Application for Environmental Permit to Alter a Body of Water	Newfoundland and Labrador *Water Resources Act* SNL 2002 c. W-4.01 Section 48	Department of Environment and Conservation
	Culvert Installation, Certificate of Approval, Application for Environmental Permit to Alter a Body of Water		
Access Roads (cont.)	Certificate of Approval for Stream Fording, Application for Environmental Permit to Alter a Body of Water		
	Permit for Access off any Highway	Newfoundland and Labrador *Urban and Rural Planning Act*, SNL 2000 c.0-8, Highway Sign Regulations	Department of Municipal Affairs

Government of Newfoundland and Labrador			
Activity	**Approval/Certificate/ License/Permit/Inspection**	**Legislation**	**Regulating Agency**
Construction of Dams	Dams and Appurtenant Structures, Certificate of Approval	Newfoundland and Labrador *Water Resources Act* SNL 2002 c. W-4.01 Section 48	Department of Environment and Conservation
Construction of Generating Facilities	Water Resources - Water Course Alterations Certificate of Environmental Approval to Alter a Body of Water	Newfoundland and Labrador *Water Resources Act* SNL 2002 c. W-4.01 Section 48	Department of Environment and Conservation
	Construction (Site Drainage), Certificate of Approval		
Stream Crossings/Fording	Water Resources - Water Course Crossings, Certificate of Environmental Approval		
Fuel Storage	Fuel Storage & Handling - Temporary Storage Remote Locations	Newfoundland and Labrador *Environmental Protection Act*, SNL 2002 c.E-14.2, Storage and Handling of Gasoline and Associated Products Regulations, 2003	Department of Environment and Conservation
	Fuel Storage & Handling - A Permit Flammable & Combustible Liquid Storage & Dispensing (above or below ground) & for Bulk Storage (above ground only)	Newfoundland and Labrador *Environmental Protection Act*, SNL 2002 c.E-14.2, Storage and Handling of Gasoline and Associated Products Regulations, 2003, and *Fire Prevention Act*, SNL 1991 c.34	Department of Environment and Conservation and Department of Municipal Affairs (Office of the Fire Commissioner)
Potable Water Supply	Water Resources - License to Drill Water Wells	*Water Resources Act*, SNL 2002 c.W-4.01, Well Drilling Regulations	Department of Environment and Conservation, Water Resources Division
Water Supply for Camp / Work Site	Water Resources - General Application for Water Use Authorization - for all beneficial uses of water from any source - Application for Permit for Using Ground Water for Non-Domestic Uses	Newfoundland and Labrador *Water Resources Act*, SNL 2002 c.W-4.01	
Water Use	Water Use Authorization	Newfoundland and Labrador *Water Resources Act*, SNL 2002 c.W-4.01	Department of Environment and Conservation, Water Resources Division
	Approval for Water Supply System		
Construction Activities	Operating Permit/Fire Season - Crown or private land for a company or individual to operate during forest fire season	Newfoundland and Labrador *Forestry Act*, RSNL 1990 c.F-23, Forest Fire Regulations	Department of Natural Resources, Forest Resources Division
	Permit to Cut Crown Timber - A permit is required for commercial or domestic cutting of timber on Crown Land	Newfoundland and Labrador *Forestry Act*, RSNL 1990 c.F-23, Cutting of Timber Regulations	
	Permit to Burn	Newfoundland and Labrador *Forestry Act*, RSNL 1990 c.F-23, Forest Fire Regulations	
	Letter of Advice to New Construction Project or Industrial Enterprise	Newfoundland and Labrador *Occupational Health and Safety Act*, RSNL 1990 c.0-3	Department of Government Services

Government of Newfoundland and Labrador			
Activity	**Approval/Certificate/ License/Permit/Inspection**	**Legislation**	**Regulating Agency**
Borrow Pits and Rock Quarries	Quarry Development Permit - A permit is required to dig for, excavate, remove and dispose of any crown quarry material	Newfoundland and Labrador *Quarry Materials Act*, SNL 1998 c.Q-1.1	Department of Natural Resources, Mines and Energy Division
Control of Nuisance Wildlife	Control of Nuisance Wildlife Black Bear Protection Permit/Permit to Destroy Problem Animals	Newfoundland and Labrador *Wildlife Act*, RSNL c.W-8, Wildlife Regulations	Department of Natural Resources, Forest Resources Division
Highway Signage	Signs, Highway Services Fingerboard Signs, Approval	Newfoundland and Labrador *Urban and Rural Planning Act*, SNL 2000 c.U-8, Highway Sign Regulations	Department of Municipal Affairs
Temporary Diesel Generation and Permanent Emergency Diesel Generation	Permit to Operate Temporary Diesel Generator	Newfoundland and Labrador *Environmental Protection Act*, SNL 2000 c.E-14.2, Air Pollution Control Regulations	Department of Environment and Labour, Pollution Prevention Division
Government of Canada			
Project Commencement	Release	*Canadian Environmental Assessment Act*	Canadian Environmental Assessment Agency Minister of Environment
Watercourse Alteration / Diversion	Permit for Construction within Navigable Waters	*Navigable Waters Protection Act*	Transport Canada
Instream Activities	Fish Habitat Authorization for Works or Undertakings Affecting Fish Habitat	*Fisheries Act*	DFO
	Application for a Water Lease		Transport Canada
Storage of Explosives	Magazine License, Temporary		Natural Resources Canada
Handling and Transportation of Dangerous Goods	Permit to Transport	*Transport of Dangerous Goods Act*	Transport Canada
Accidental Hazardous Material Spill	Reporting Mechanism / response	Guidelines for Reporting Incidents Involving *Dangerous Goods, Harmful Substances, and/or Marine Pollutants. TP9834E. under* the *Canada Shipping Act*	DFO - Canadian Coast Guard
Communications	Application for License to Install and Operate a Radio Station in Canada	*Radiocommunication Act*	Industry Canada, Communications
Municipal Government			
Waste Disposal	Approval to dispose waste in municipal landfill		Relevant municipality